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### Improved Separator and Thrasher.

This machine is intended to clean and separate grain from the straw at one operation, and to deliver it at the lower or bottom part in marketable condition, free from dust, chaff, sticks or other rubbish calculated to destroy its appearance, soundness and market value. The several motions necessary to effect the object are all combined in the machine here shown, and the appended description will convey a clear idea of them.

The grain to be separated from the straw is fed in to a revolving toothed cylinder contained in the case, A, and driven by the belt over the pulley, B. This cylinder has a space beneath it, concave in shape, which is also armed with teeth or projecting pins. In being drawn through these teeth the grain is stripped from its straw, and passed over the perforated shakers, C, from whence it afterward falls down on to a grain board, D, suspended from the side framing of the machine, by the straps, *a*, while the straw passes on to the rear of the machine. The shakers are inclined in opposite directions, so that no grain can pass off at the end with the straw. The motion of the shakers is derived from a crank shaft, not shown, and they move in opposite directions to each other.

The shakers have not only a reciprocating but a jolting movement, at the same time, so that they act first to expand or draw out the straw, and afterward crowd the same together, so that no grain can be carried off with it. This mode of hanging the shakers so that they move in opposite directions, renders the transportation of the machine in wagons much easier to it, for the tendency to oscillate violently or surge back and forth is almost entirely obviated.

The grain board has a similar jolting and reciprocating motion, but in an opposite direction to that imparted to the shakers, so that while the straw is being thrown in one direction by the shaker the grain is being tossed in another.

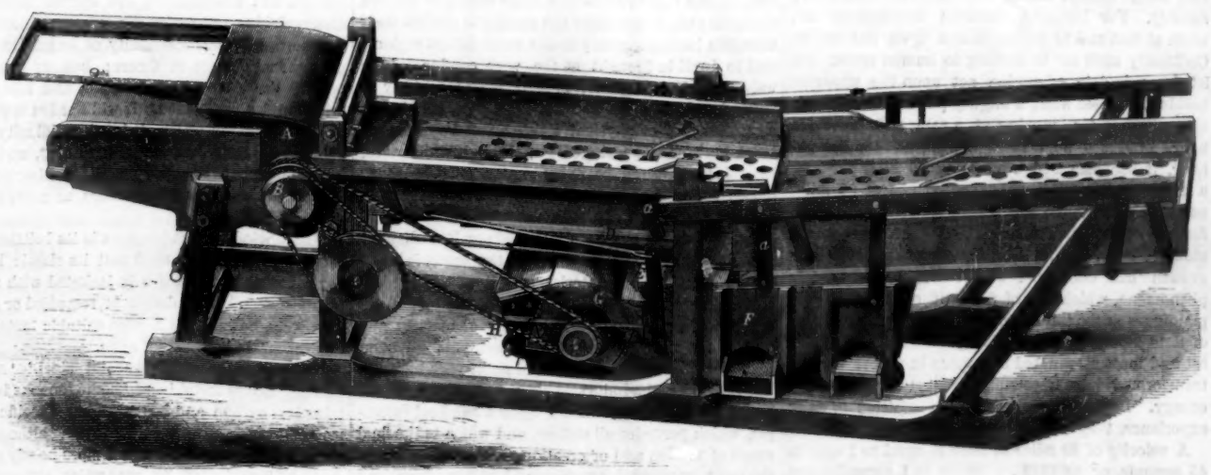
On the shakers, C, there may be seen a set of fingers, F, which are operated by suitable mechanism in the body of the machine. The office of these parts is to expand and contract the grain and straw alternately or to stir it, and also to detach whatever loose grain may still be caught in the straw after its passage through the toothed cylinder.

From the grain boards previously spoken of the grain falls on to an inclined platform, E, and is from thence discharged into the shoe, F, which has a shaking motion given it from above. The grain, in passing from the platform to the shoe falls through a current of air generated by the fan, G, whereby the dust and all foreign matters are driven off at the openings.

The fan case is provided with valves, H, so that if the current of air be greater for the kind or quality of grain under process of cleansing, than is necessary, these valves open and relieve the excess, so that the grain is not carried over with the chaff. These valves can be adjusted by means of levers and weight and the quantity of air or power of the blast can thus be regulated with great nicety without varying the speed of the machine or the other parts. There is also a sieve or riddle within the shoe, upon which the grain is received from the inclined platform, the grain passes through this riddle on to others of finer mesh while the chaff dust, etc., are driven off as before mentioned.

These are the principal details and the operation of the machine. Horse-powers, varying in capacity from two to ten horse, are made and sold in connection with the machine; "Pelton's Triple Gear Iron Horse-power," is the name given it by the manufacturers.

This machine is said to be very effective, and being a combination of two separate ones there is a saving of time and labor. It was patented through the Scientific American Patent Agency on the 20th of September, 1864, by Samuel Pelton, of Trenton, N. J. For further information address the manufacturers, Fell, Pelton & Brearley, Eureka Agricultural Works, Trenton, N. J.



PELTON'S THRASHER AND SEPARATOR.

### A STONE FALLING THROUGH THE EARTH.

MESSRS. EDITORS:—In Vol. IX, No. 9, SCIENTIFIC AMERICAN, Mr. John A. Roebling, in his remarks on the subject of force in general states that "A rock at rest, that is supported by a secure foundation, produces pressure, but this pressure is no force without motion. The simple pressure is balanced by the reaction of the foundation, but at the same time this pressure is felt through the whole earth." How can that pressure extend any past the center of the earth? Could a hole be excavated through the earth and the rock dropped therein, it would undoubtedly descend until it reached the center of the earth, and there stop, but should it still continue on its course then there would be exhibited the funny phenomenon of an object descending up on the other side of the globe. Ditto. pressure. R. B. S.

[If a hole were made through the diameter of the earth, and a stone were dropped into it, then, were it not for the resistance of the air and the rotation of the earth upon its axis, the stone would descend with constantly increasing velocity till it reached the center, when its momentum would carry it through to the opposite side; it would then fall back with the same movements and would thus continue to oscillate back and forth forever. But if the hole were filled with air, the motion would be resisted, the stone would rise each time to a less distance from the center than that from which it descended, and would finally be brought to rest exactly in the center of the earth, where it would rest suspended so that it could be moved from its position by the slightest breath. This would be the motion of the stone if the hole were made through the axis of the earth from pole to pole. But if the hole were made across this axis, the motion of the stone would be modified by the rotary motion of the earth. In this rotary motion the parts at the surface have a higher velocity than those nearer the axis. The stone, starting from the surface with this higher velocity, would soon come to parts moving with less velocity, and would come in contact with the east side of the hole, against which it would rub till it reached the center. Here its motion due to the rotation of the earth would cease, and as it was carried onward by its momentum, it would come in contact with parts having this motion, and would continue to rub, still against the east side of the hole, till it should be stopped by the friction.—EDS.

POSTAL MONEY ORDERS.—The payment at the New York post office on money orders sent from various parts of the country average at the present time $1,500 a day; and the total sum received by our citizens through this source, during a month past, has been about $35,000. The money sent from New York to the country through the post office does not exceed one third this amount.—*N. Y. Post.*

THE area of the end of a cylinder multiplied by ts length equals its cubic capacity.

## REMARKS ON THE SUBJECT OF FORCE IN GENERAL.

BY JOHN A. ROEBLING.

[For the Scientific American.]

[Concluded from page 144.]

The greatest mechanical effect results from impact, which is simply an aggregate of developed momenta. In impact the whole force is spent. The value of impact is equal to the mass multiplied by the square of velocity. A chemical explosion results from an instantaneous discharge of the whole pent-up force. The whole energy which is asleep in gunpowder, is roused into simultaneous action. The more instantaneous this development the greater its effect. This effect now is due to the rapidity of motion with which the aggregate massiveness flies apart into atoms. The heat which is rapidly developed in the combustion of powder, converts its solid particles into highly elastic vapors, whose weighty atoms repel each other with immense energy, and whose aggregate force is to be rated like impact by the square of velocity multiplied by the massiveness of the gases.

Only that is considered a natural effect or phenomenon which is experienced in some way by our senses. How an apparent nothing may suddenly become a very severe reality, nature sometimes illustrates very forcibly. For instance, common atmospheric air, when at rest makes no impression upon our senses. Ordinarily such air is nothing to human sense. But let the principle of motion act upon the apparent nothing, and see what a mighty power has suddenly sprung up. Air, moving at a rate of 3 miles per hour, produces a pleasant breeze; at 10 miles per hour, it becomes a high wind; at 30 miles per hour a strong gale will be experienced; but at 80 miles per hour a hurricane will sweep along whose terrific force will demolish massive buildings, uproot the stoutest trees, and level to the ground forests whose growth has consumed centuries! These terrible phenomena, which are of frequent occurrence, very plainly teach the important fact, that by the element of time alone—that is, velocity—the thinnest, lightest and most attenuated substance in nature may be transformed into a terrible medium of destructive energy. Because these things are matters of daily experience, they are seldom reflected upon.

A velocity of 80 miles an hour is equal to 1 mile in 45 seconds, or 0·02222 . . . miles in 1 second. But how small is this velocity, when compared to the speed of electricity, of light, or of thought, which is spiritual motion? Light is known to move at the rate of 195,000 miles in one second, which is 8,775,877 times the velocity of a hurricane moving 80 miles an hour. Suppose now the velocity of air increased to 195,000 miles per second, then the impact or total energy of this force would be to the energy of a hurricane $1^2 \div 8{,}775{,}877^2 = 1 \div 77{,}016{,}000{,}000{,}000$. The energy of force, therefore, resulting from the velocity of light, imparted to air, would be more than 77 million of million times as great as the energy of a hurricane. And invariably we are authorized to conclude, that an ethereal substance, moving 195,000 miles per second, will produce the same mechanical effect, as a hurricane, provided this ether is 77 million of million times as light as is atmospheric air.

The object of the above calculations is not to institute a comparison between the nature of the motion of air and of light, but simply to point out the great importance of the element of speed or of time. Nature's internal silent actions are produced by motions of inconceivable rapidity, so great that they are invisible to observation. And in the same ratio as the square of velocity of these movements *increases*, may the massiveness or weight of the moving substance be *decreased*. It is known that the impingement of the particles of air, when moving at hurricane speed, and acting upon each other, and upon other substances, produce friction, heat and electricity. When acting upon the exposed rocks and metals of the mountains, the same force will disintegrate them and carry them along through the atmosphere. But how much more potent is not the energy of lightning. The friction of the air produces intense heat and light, phenomena which accompany every stroke of lightning.

Electric action is an inner dynamic process, by which matter is moved, transformed, and energy produced. The principle of motion is *uncreated*, it can therefore only be communicated or transmitted from one substance to another substance or from one process to another process. But to transmit or communicate, requires a medium, and this medium is ether, the universal substance which permeates all natural substances and fills all space. If a suspended piece of iron is attracted by a magnet, the attractive force acts through the medium of ether. By the process of magnetism the peculiar magnetic motion is communicated from one particle of ether to another, and these transmitted energies, which result from the mutual action of the two bodies, overcome the gravitating tendency of the iron.

The motion of light is 195,000 miles per second. But this is only the outer velocity of motion, which communicates energy from one particle of ether to another. Light is not a substance, but only the effect of luminar energy. The internal spiral motion, which may be the inner cause of the outer motion, may result from a velocity of which we have no conception.

Human thought is elaborated in the human brain by a material process, which is matter in motion. As repeatedly said, the principle of motion in itself is nothing, in a natural sense; it becomes a reality only through the massiveness, the inertness of matter. Every man is conscious of the reality of his own thoughts; all men possess the faculty to project their thoughts instantaneously to the most distant regions, and to dwell in thought at the very confines of the universe. This is actual motion, whose rapidity is beyond calculation. The speed of mental light far surpasses that of physical light. And from this we infer, that the ethereal medium, through which outer light is transmitted from star to star, must be much denser than the more interior spiritual essence, which conveys the flashes of the human brain.

There always have been two more or less distinct schools of philosophy, known as the *material* and the *spiritual*. The material school of the present day maintains that the final cause of motion, of energy, of life, resides in the elements of matter; and that by the combination of these elements all complex structures and organisms of nature are built up. The other school admits this view, as a matter of fact, but at the same time insists upon a spiritual principle, which pervades all matter, and which is the final cause of motion and of creation. Although some of the most successful experimental philosophers, and some of the first physiologists of the present age, advocate the pure material hypothesis, yet when the arguments and facts of both sides are calmly balanced, the unprejudiced mind, which only cares for truth and nothing for authority, will unhesitatingly embrace the spiritual philosophy, as the only one, which does rationally account for life and existence.

The advocates of pure materialism object to the idea of a *Final Cause*, yet Auguste Compte, in order to introduce some unity into chaos, was laboring hard to find out some sort of primary cause, which governs the harmony of the whole, and he accordingly pointed out, that gravitation perhaps might answer that purpose. But there are hosts of great men in continental Europe, living and teaching, as for instance the excellent Prof. Moleshott, now at Turin, who consider it entirely beneath themselves, to look for any such primary cause. In fact, then, men do only *indirectly* acknowledge the *unity* of nature, because if they did *directly*, they would be *forced* to look for some *central cause*, to which this *unity* refers, and from which it proceeds. To say that 65 or 70 chemical elements possess a natural instinct, which makes them act according to law, and that all processes of nature are governed by their inherent affections and lawful tendencies of matter, leaves us only to wonder and to guess where these miraculous laws come from? Nor does this view explain why all these apparently incongruous materials and agencies behave in such *perfect* accord and unison, that the grand objects of creation, its growth and development are accomplished; nor why the motions of the whole immensity proceed according to rigid and invariable mathematical principles? Where did the idea, this law of mathematics, originate? Which is prior or first—the idea or its application? Did the scientific plan of the universe originate in the 65 chemical elements? Or were these elements constituted according to those ideas, and instinctively endowed with scientific tendencies, in certain well defined channels, and for certain well understood and *pre-ordained* and fixed purposes and ends?

The science of mathematics, in its largest sense, is the science of space and time, consequently it is the science of material creation; all other sciences refer to it and are built upon it. There can only be one true *abstract* science, and this is the science of mathematics. Other sciences are only collections of systematized experiences and observations, without any abstractions. But *before* that immense *abstract* science which *does* regulate and govern the universal process of material existence, could be spontaneously evolved as a *material* demonstration, the Great Mathematician, the Great Central Brain of the Universe, had to exist! The science of mathematics is simply a spontaneous outflow from the Central Source of Life, and this spiritual out-flow has manifested itself in mathematical forms and motions through the vehicle of matter. Pure materialism is a growth of human self-conceit, while simple truth will always tend toward a divine Central cause!

## HIGH AND LOW STEEL.

We extract the following remarks on this subject from "Holley's Ordnance and Armor:"—"By high steel is meant that which contains a large amount of carbon, and consequently low specific gravity. Its distinguishing properties are extreme ultimate tenacity, hardness, and capability of extension without permanent change of figure; but its extensibility beyond the elastic limit is small, and it is therefore brittle under concussion. It will harden when heated and immersed in water; it is with difficulty welded, because it deteriorates under high heat, and because its welding heat is so very near its melting point; and it is melted at a low temperature as compared with wrought iron.

"Its obvious defect for guns is its brittleness; but if so large a mass is used that its elastic limit will never be exceeded, or if it is jacketed with a less extensible metal, this defect is remedied or modified. Low steel, however, is a more suitable metal for cannon, according to present tests.

"Low steel, also called 'mild steel,' 'soft steel,' 'homogeneous metal,' and 'homogeneous iron,' contains less carbon and has a higher specific gravity; it can be welded without difficulty, although overheating deteriorates it, and it more nearly resembles wrought iron in all its properties, although it has much greater hardness and ultimate tenacity, and a lower range of ductility, depending on its proportion of carbon. It has less extensibility within the elastic limit than high steel, but greater extensibility beyond it; that is to say, greater ductility.

"The grand advantage of low steel over wrought iron, for nearly all purposes, is, that it can be melted at a practicable heat and run into large masses; thus avoiding the serious defect of wrought iron in large masses—want of soundness and homogeneity. Its other important advantages for cannon are, greater elasticity, tenacity and hardness.

### ELASTICITY AND DUCTILITY.

"Mr. Anderson, Sir William Armstrong, Mr. Mallet, and others, complain, in various public statements, that most of the steel they have experimented with for guns is too brittle—that it gives way under *sudden* strains, which wrought iron will stand. Hence steel, especially high steel, has been condemned as a cannon metal.

"In answering this objection let us briefly review what has been said under the head of 'ductility.' Suppose two thin tubes of equal size, one of high steel and the other of wrought iron, to be subjected to the violent and sudden strains of gunpowder. The elastic limit of the steel is overcome, and it soon breaks, because it has but a small reserve of ductility to draw upon, to eke out its integrity. The elastic limit of the wrought-iron tube is overcome much sooner, but it has an immense capital of ductility to expend, and so it stretches and stretches for a long time without fracture.

"Now suppose the quantity—thickness of steel to be increased just so much that the pressure—proof charges, for instance—will never overcome its elastic limit, that is to say, so that its particles will return to their original position after the pressure ceases. Its original resistance to the next strain is then unimpaired, and there is no evidence that it will ever be-

come impaired; for elasticity is simply the antagonism between two tireless and changeless forces—repulsion by heat, and the attraction of cohesion.

"But in order to bear the same pressure (and the demand is for the highest possible pressure of powder), the iron, equally increased in quantity, will stretch beyond its elastic limit, and therefore must depend upon a new arrangement of particles and a new limit of elasticity for continued cohesion. Its great ductility allows this re-arrangement to continue for some time; but although it may stretch to a less distance at each renewed application of the pressure, its ability to stretch and its range of elasticity are constantly diminishing, until it at last arrives at a point where it can stretch no further without fracture. It has exhausted its reserved ductility. If it were not so, iron would never be broken at all by stretching. In addition to this, although a given area of stretched iron may sustain more than the same area of the original metal, the total area is constantly diminishing. It is, to a great extent, a substitution of a little strong iron for much weak iron. In order to endure *as long* as the steel, the iron must be still greater in quantity, because the 'work done' to raise it to its limit of elasticity is less than that required to raise steel to its limit of elasticity.

"This explains the failure, after short service, of thin tubes made of the moderately high steel heretofore used, while thin iron tubes *appear* to be unimpaired by elongation, although they certainly are impaired from another cause—compression. It is simply a question of excess of metal and, practically, endless endurance, on the one hand, and ultimate failure on the other hand.

"The serious mistake in the use of the steel heretofore obtained, for extreme charges of powder, appears to have risen from the neglect of the whole subject of the elastic and the ductile limits. Because the *ultimate strength* of steel was higher than that of iron, the quantity of the material has been proportionately reduced, when its quantity should have been proportioned to the work done in overcoming its resistance to extension.

"If steel, or any metal requiring the highest attainable effort of force in motion to stretch it *within* its elastic limit, could also be made to have a great range of ductility beyond it, the safest and most perfect cannon-metal would be obtained. But unfortunately, as the one property increases the other decreases. Low steel, the amounts of metal being the same in each case, would stand more pressure than iron within the elastic range, and would stand sudden strains longer than high steel; but its elastic limit once exceeded, from any cause, it would fail sooner than wrought iron. As a compromise between high steel and wrought iron, it has this advantage, that a small increase of weight of material will b[illegible] considerable increase of pressure, within the limits of safety.

"But according to Mr. Kirkaldy's experiments, the lower steels have a considerable degree of extensibility before fracture, and so much tenacity that the work done in stretching them to rupture actually exceeds that required to rupture the best wrought iron."

### An English Operative in an American Factory.

A Sheffield cutler, working in one of our Eastern factories, wrote to his comrades at home stating his views of our workshops, etc. We make an extract from his letter. The remarks about the division of labor indicate a lack of knowledge. It is practiced more extensively here than elsewhere, and our manufacturers were the first to institute regularly organized plans for accomplishing specific objects.

The great number of large works—cotton, woolen, edge-tools, files, table knives, indeed all kinds of trade—carried on, and in a first-rate style, too, will soon enable them to compete with England for the markets of the world. Look out, you at home; go ahead, or the Yankees will trip you up in trade matters. I don't think they could compete with you yet in their own markets but for their tariff. They have not got the division of labor amongst the materials, as you have; they have not the iron and coal, and the material trades so concentrated as you have, and then, from the demand for labor, don't work for so little as you do. Steel comes from one distant town; tip handles from another; coals and bone handles, wire tools, etc., etc., from others. Ivory in tusk is six dollars a pound. They do far more with machinery in all kinds of trades than you. Men never learn to do a knife through, as they do in Sheffield. The knives go through thirty or forty hands. One matches and resins all; another pins all; another bores all handles; another glazes all blades, and another buffs all handles. I myself glaze and chill all the better knives they make at Hanover Works, and nothing else, from day to day. If a Yankee can resin a knife on, they call him a cutler; and by doing one thing all the time they become very expert, and make some very good knives. Not the variety you make, but such patterns as are done easiest by machinery, and there is a large quantity made, I assure you. The Englishmen get the best wages, because they can go to any part of a knife, and the Yankee don't like it. The system of managing here is for one man to be responsible for the forging of blades. All are made by trip hammers. He is a practical man, able to mend tools and see all the machinery is in order; he is called the 'boss blacksmith.' Another attends to the grinders and sees that the blades are properly done, and the orders attended to. Another attends to all the steel forks. The last came from Sanderson's, Carver street, Sheffield; [the former, doubtless; not the forks, certainly;] he attends to all the hands engaged on forks. Then the work we call hafting is let to a job hand who employs all the men he needs to put the work through. He takes the job at so much the hundred. All are reckoned by the hundred here, and are taken, carvers, tables and desserts, at one price, in most cases; but grinding and less carvers get the better above all these bosses. There is what you call a table knife manager who gives out the materials as toe come in to those they belong to, sees they are finished right, and to whom the superintendent refers all letters and information as to what is wanted, and he sees that the things wanted are attended to and put through. The superintendent is the head 'boss' over the men, lets the jobs, sets the price, turns off and sets on, and keeps a few hands always at liberty to go from job to job when needed; and these are called 'company hands.' All are Englishmen, who know how to go at any part of a knife, for the Yankees are brought up to one or two jobs and cannot shift about. Men who have jobs, matching and resining, for instances, set on and turn off their extra hands as they like, and if any of them are stuck with their work, the 'company's hands' are sent to help them out, and he has to pay them after the rate the company pays. They work by the hour. I am a 'company hand,' so is Joseph H———, and H. B———. The superintendent is responsible to a board of directors, elected by the company, who are shareholders. Nearly all the works here are shareholding concerns, and there is such smashing up amongst these companies! The shareholders differ from the managers, the managers get experience and set up for themselves, or demand nearly all the profits. The orders are not sent direct to the works, but they have agents or sale-shops at New York and other places, who send the orders and keep, if possible, their shelves fully supplied with trashy articles. The people here are far more steady than in Sheffield. Men seldom go off drinking here. There are no 'bull weeks,' and no holiday at the Christmas time unless you take it. The works were not stopped one hour this Christmas. There are no beggars here; all seem very well off, and far better dressed than working men in Sheffield, and far cleaner. The methods of working are far easier; indeed, the Yankees will not do hard work, if possible. There are not as many files used among 200 men as you could put in your pocket.

[There are some funny statements here, and some that are quite incredible.—Eds.

### Remedy for Scale in Boilers.

We have been shown a large fragment of some foreign matters which had been deposited on the boiler of the steamer *Bowman*. This scale was removed by "Temple's Liquid," a preparation for the object in question now much used in different parts of the country. It is stated that this article is a perfect remedy for the trouble, and is guaranteed to give satisfaction in all cases. Attention is directed to an advertisement in the usual place.

### Shells and Beaver Skins for Money.

Amongst the objects of natural history and ethnology brought from British Columbia and Vancouver's Island by Mr. J. K. Lord was a belt composed of numerous specimens of a species of *Dentalium* strung together.

"It is somewhat curious," observes Mr. Lord, "that these shells (*Entalis pretiosus*, Nuttall sp. *Entalis vulgaris?*) should have been employed as money by the Indians of North-West America—that is, by the native tribes inhabiting Vancouver's Island, Queen Charlotte's Island, and the mainland coast from the Straits of Fuca to Sitka. Since the introduction of blankets by the Hudson Bay Company, the use of these shells, as a medium of purchase, has, to a great extent, died out, the blankets having become the money, as it were, or the means by which everything is now reckoned and paid for by the savage. A slave, a canoe, or a squaw, is worth in these days so many blankets; but it used to be so many strings of *Dentalia*. In the interior, east of the Cascade Mountains, the beaver skin is the article by which everything is reckoned—in fact, the money of the inland Indians.

"The value of the *Dentalium* depends upon its length; those representing the greater value are called when strung together, end to end, a 'Hi-qua'; but the standard by which the *Dentalium* is calculated to be fit for a 'Hi-qua' is, that twenty-five shells placed end to end must make a fathom, or six feet in length. At one time a 'Hi-qua' would purchase a male slave, equal in value to fifty blankets, or about $250. The shorter and defective shells are strung together in various lengths and are called 'kop-kops.' About forty 'kop-kops' equal a 'Hi-qua' in value. These strings of *Dentalia* are usually the stakes gambled for. The shells are generally procured from the west side of Vancouver's Island, and towards its northern end; they live in the soft sand in the snug bays and harbors that abound along the west coast of the island, in water from three to five fathoms in depth. The habit of the *Dentalium* is to bury itself in the sand, the small end of the shell being invariably downwards and the large end close to the surface, thus allowing the fish to protrude its feeding and breathing organs. This position the wily savage has turned to good account, and has adopted a most ingenious mode of capturing the much-prized shell. He arms himself with a long spear, the haft made of light deal, to the end of which is fastened a strip of wood placed transversely, but driven full of teeth made of bone, resembling exactly a long comb with the teeth very wide apart.

"A squaw sits in the long stem of the canoe and paddles it slowly along, whilst the Indian with the spear stands in the bow. He now stabs the comb-like affair into the sand at the bottom of the water, and after giving two or three stabs draws it up to look at it; if he has been successful, perhaps four or five *Dentalia* have been impaled on the teeth of the spear. It is a very ingenious mode of procuring them, for it would be quite impracticable either to dredge or net them out, and they are never, as far as I know, found between tide-marks.

"At one period, perhaps a remote one, in the history of the inland Indians, these *Dentalia* were worn as ornaments. I have often found them mixed with stone beads and small bits of the nacre of the Haliotis, of an irregular shape, but with a small hole drilled through each piece, in the old graves about Walla-walla and Colville. In all probability these ornaments were traded from the coast Indians; but as these graves were quite a thousand miles from the sea, it is pretty clear the inland and coast Indians must have had some means of communication."—*Technologist.*

### Slow and Sure.

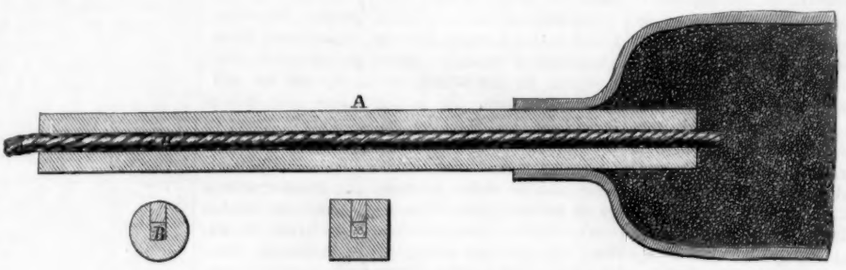
Mr. Thomas Cook, correspondent of the New York *Herald*, writes as follows from Fort Fisher:—

"The enormous shells of the monitor were thrown with unerring precision at so short a range, every one exploding with effect. Not a shot was wasted from this vessel. Although she fires but slowly, she accomplishes infinitely more in attacking such a work than all the rest of the fleet combined. With her it is a perfect matter of indifference whether the fort responds or not; and at every discharge cartloads of sand are shoveled out of the wall of the fort."

### Fuse for Blasting.

Blasting coal in dry situations has been performed in the anthracite coal regions of Pennsylvania mostly by the needle—a round piece of iron or copper, from three to five feet long, tapering from five-eighths of an inch to a point. The needle is inserted in the cartridge or charge of powder, to the depth of a few inches, when the powder is pushed to the extremity of the hole which is tamped by moistened fine coal to its mouth. The needle is then drawn and a squib and match are fixed in the space occupied by the needle, by which means the charge is exploded.

In wet situations, where feeders of water are cut by the drill hole, an iron tube is resorted to. This tube is made from three to four feet long and about a quarter of an inch in diameter. To use the tube, a water-proof cartridge is made on a proper former. The cartridge is charged with powder within a few inches of being full. Before the upper end is closed the tube is inserted and secured by means of a piece of string which wraps the end of the cartridge over the end of the tube in such a manner as to make a water-tight joint. The tube and cartridge are then placed in the drill hole and tamped; the charge is exploded by means of an ignited squib running through the tube. Simple as these modes of blasting appear they are open to serious objections. With the needle the hole is apt to collapse after the needle is drawn, or the charge liable to be prematurely ignited by the friction occasioned by the operation of tamping, or of drawing the needle; the lives of the miners are then in imminent danger. The danger is not so great in using the tube, but it has the disadvantage of being unwieldy; and when the veins dip at the rate of 40° and upwards, as they very often do, if the barrel is not chained it is blown away down the excavation among the loose coals where it is not safe for the miner to search for it. And in more favorable instances, where the tube is found it is often bent like an S, or perhaps broken in two or three parts, when a new tube is necessary. In a strong coal a tube does not often fire more than half a dozen blasts. Sometimes when chains are used to secure the tubes, the blasts force both chains and tubes into the breast when all are lost, costing together almost as much as a miner's day's work is worth. And when the chains hold on to the tubes they often have to be dug out from under tuns of loose coal.




WALTON'S FUSE FOR BLASTING.

To avoid all this unnecessary labor and to render the operation of blasting more safe, an improved safety fuse has been invented and is here shown, it may be used in coal as in rock. The fuse resembles a case of wood, A, about three-eighths of an inch thick, either round or square, and of any desirable length. Within the case is a train of powder, a small piece of fuse made in the usual way, or a small thread of gun-cotton. The combustible material, B, is laid along a groove cut in a piece of wood and then covered over by oakum and pitch or any water-proof material to protect it from the action of moisture. In case of gun-cotton being used a piece of wood is fitted into the upper part of the groove and secured there by glue. The whole outer surface is covered by a coat of pitch and tar to make the fuse water-proof. This fuse is not only intended to be used as a substitute for the iron tube in blasting coal, but also in rock, where, owing to the protecting case, the train will not become detached by the cutting of the fuse. The invention was patented through the Scientific American Patent Agency, Jan. 3, 1865, by Thomas H. Walton, of Ashland, Pa. Further particulars can be had by addressing the inventor.

### Water-proof Cement.

Mr. Joseph Schofield, of Wappelo, Iowa, writes us that he makes a valuable water proof cement by the following recipe:

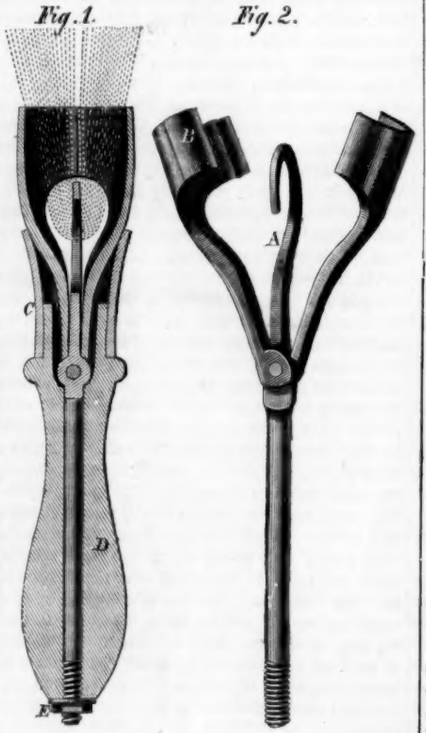
Take new sweet cheese and work it in hot water until the butter or greasy portion is all removed. This changes the cheese into a tenacious slimy mass. When thoroughly washed, remove the cheese to a hot stove, and knead a quantity of air-slacked lime in so that the mass will be sufficiently stiff for use. It must be applied forthwith as it sets rapidly. The articles to be joined must be heated quite hot, as high as 200°, or scalding water, then united and bound so they will remain in contact until set; in about three days the articles may be used. It is said that this cement is capital for aquaria; also for wood, glass and stone, or earthen ware. Mr. Schofield states that he has tried it on a steam boiler and that he made a "soft patch," so called by boiler makers, with great success.

As the materials from which this cement is made can be had any where in rural districts, it will be well for engineers and housekeepers to bear it in mind.

### RUDOLPH & KASEFANG'S BRUSH HANDLE.

Iron castings when taken out of the sand have a large portion of the same adhering to the rough sides, and many men get a living by cleaning off this sand so as to render the castings fit for use. The instrument they employ for some parts of the work is a wire brush. Convenient lengths of wire are taken and doubled over and bound together; the free ends of these wires form the brush, and is used as any other utensil of its kind. These brushes can be used up to the handle, but that portion which is grasped, must be thrown away when the brush part is worn up short, so that quantities of wire are thus wasted, which ought not to be.

*Fig. 1.* *Fig. 2.*




The object of the handle illustrated in Figs. 1 and 2 of the engraving is to hold the wires firmly and cause little or no waste in material. The wires are turned over the hook, A, as shown by the dotted lines in Fig. 1, and then bound by the clamps, B. These clamps are hinged and the ferule, C, holds them both firmly closed. The handle, D, is removed by taking off the nut, E, when the brush is to be renewed.

This arrangement gives a firm support to the wires and a most convenient handle to the brush, while it is far more economical than the present brushes for the purpose. It was patented through the Scientific American Patent Agency, on the 29th of November, 1864, by Fred. Rudolph and William Kasefang; for further information address them at 21 Essex street, Jersey City, N. J.

### A Peculiar Wages Arrangement.

In the last number of the *Technologist* there is a description of a sugar refinery in Bengal which closes with this statement:—

"Lastly. We may remark that the wages of every *employe* in the Cossipore factory, from the head boiler down to the coolie, who carries the bags of sugar (weighing nearly two cwt.) to the export warehouse—that all these wages are calculated according to the production of manufactured sugar during the month. The result is, that every one works with a sense of self-interested alacrity, which would astonish some of those complacent Englishmen who regard the Hindoos as a set of lazy, lethargic barbarians.

### A PRACTICAL PLAN FOR DESTROYING THE SPAN WORM.

On Tuesday evening, Feb. 21, Dr. Trimble, of Newark, N. J., the well known naturalist, delivered a lecture before the Horticultural Association, at the American Institute, on the span worm, or measure worm, that is so destructive to the shade trees of this city. Though the lecture occupied more than an hour in delivery, it was listened to by the large audience present with quiet interest from beginning to end. The success of Dr. Trimble in securing and holding the attention of a promiscuous audience for so long a time on the subject of a single worm is attributable partly to his own interest in the subject, and partly to the happy plan of giving his lecture the narative form. He read a diary of his observations throughout the season of the insect's life.

THE EGGS.

The lecturer first exhibited a handful of branches on which were large numbers of eggs, and called attention to the fact that the eggs were nearly all on the lower sides of the limbs. He stated that no degree of cold injured the eggs, but that when ice collected on the branches it was sometimes fatal to them.

WONDERFUL INSTINCT OF THE MOTHER.

The diary commenced with the coming forth of the leaves on the 8th of May. The degree of warmth that is necessary to bring forth the leaves is also just the degree that is required to hatch the eggs. The mother knew this last July when she deposited her eggs, and therefore selected those trees which would put forth their leaves at the same time that the eggs would hatch.

"It may be asked, How do these little feeble, fluttering things know which are the right trees? I can not answer. We call it instinct. But what is instinct? It is a word we use to answer a question, but it is not a definition. The insect world is full of such wonders. They are the manifestations of the guiding hand of God Almighty."

JARRING THE TREES.

"June 9. Visited Brooklyn to-day to see the worms. At one place I saw a negro man with a pole some 20 feet long, with a cross piece about six inches in length fastened to one end of it; and with this he was jarring the 'critters', as he called them. He was the most sensible man I have ever met with on the worm question. He jarred and jarred, and I picked up till I got my handkerchief full, and then he killed the remainder."

THE CEDAR BIRD.

"Later in the day, after a shower, I visited Madi-

son Square to see about that flock of cedar birds. While talking with the keeper of the park about them, I heard the familiar low, whispering whistle, like a boy just beginning this accomplishment of youth, when he cannot get out the sound above his breath. Soon a few could be seen coming to a tree near us, and very soon more, and then almost continuously, until several hundreds were busily at work within fifty yards. These birds have been every day more or less for two weeks, generally coming early in the morning and towards evening, but often at other times also. To-day they grew so familiar from being undisturbed, that I could approach within three or four yards of those at work on the under branches. Here was no necessity to kill and dissect to know what they eat.

"The cedar bird has not the foot of the woodpecker and creepers; they are not so graceful in the pursuit of their game as the orioles and warblers, but they have become wonderfully expert in taking these span worms. Sometimes they will reach out to their utmost extent from the twig they stand on to the worm on another; often the twig yields so much to this pressure in the opposite direction, that the bird misses the worm, and has quite a flutter to recover himself, but as soon as righted up, he tries again, persevering till he gets the prey. Often they would take the worm from the end leaf of a pendent twig, where there was no way of reaching it except on the wing as the fly catchers do, hovering over their intended victims like the king fisher and the ospray.

"Some few of the worms are already curling the leaves that are to be their cocoons. As soon as they shut themselves up in these houses, they begin to contract in length, the lower part of the body grows larger, and they lose their activity. This seemed something new to these birds, and I was very much amused at the difficulty they had in getting the worms out; especially where the bird and worm—or rather chrysalis—were on separate twigs. The bird, when he would take hold, would pull hard, bringing the two twigs suddenly together, and leaving no chance of purchase; then he would let go and away the two would separate with a spring. It would now take sometime to adjust matters, but he would try again. In one case I counted ten attempts before the prize was secured.

WHAT TO DO.

"June 10, I had a long talk to-day with the keeper of the Union Square. He told me the birds are more numerous this year than ever before, and he has watched them carefully for years. He told me he had tried to have the parks closed during their visitation, so that they should not be disturbed by the people, especially by the children, but could not succeed. But one wet Sunday that park was closed. The birds came in a great flock, and would come to the ground and even on the benches after the creeping worms. This was the most valuable testimony I have ever got on this question.

"Should these birds come just so another season, and the people or the city government close the parks and fill them with poultry, and then jar down faithfully, the worm pest could in a single year be placed at the mercy of the Ichneumon fly."

## MANUFACTURE OF BELLS.

At the meeting of the Polytechnic Association on Thursday evening, Feb. 23d, Mr. Harrison, of the Am. Bell Co., New York, described the process of casting bells, and made some very interesting remarks in relation to the manufacture.

THE FIRST AMERICAN MANUFACTORY.

Until within a few years there was but one establishment in the country devoted exclusively to the manufacture of bells, and that was the foundery of Mr. Meneely, of Troy, in this state. About thirteen years ago, Jones & Co. went out of Meneely's employ, and commenced business on their own adcount, and now there are several bell making establishments in the country.

MAKING THE MODELS.

Formerly the models for all large bells were built up of brick work. When we get an order for a bell of given weight, we first estimate the size for the prescribed number of pounds. Then the drawing is made with great care of the profile from the center to the flange on one side of the bell for both the outside and inside lines. The space beween these lines indicates the thickness of the bell in all its parts. This drawing is then transferred to a board, and the board is cut to the line. The mold for the interior is built up of brick and mortar, the form being given by attaching one edge of the cut board to a shaft rising out of the center of the pile, and sweeping the board around the mass. Then a layer of molding sand, corresponding in thickness and form to the bell, is packed upon the core, the external form being given by sweeping the board which has been cut to the outer profile of the bell around the layer of sand. A brick-work mold is then built over the sand. This outer mold rests upon an iron plate so that it may be raised up by a tackle to remove the sand, when it is lowered to its place again, and the mold is completed.

This was the former process, but soon after Jones & Co. commenced operations they introduced an improvement in molding which effected a very great saving in the cost of bells. This improvement consisted in fashioning for the mold two iron shells, one for the core and the other for the outside, provided with great numbers of pins for holding layers of molding sand in place. A patent for this improvement would have been an immense fortune, and both Jones & Co. and Mr. Meneely applied for one, but they failed, as it was shown that the invention was made by a workman of the name of Peacock.

STEEL BELLS.

The steel fire bell for the city of San Francisco, which was exhibited at the park in this city, was cast by Naylor, Vickers & Co., of England. The metal for that bell was melted in 106 pots of 100 lbs. each, and it took 106 men to pour it. By improvements which have been made in this country we can now cast a bell of that size by the labor of six men, and the cost is reduced from $1 per lb. to 25 cts. per lb. The steel is made in the same furnace in which it is melted.

EFFECT OF THE TOPOGRAPHY ON THE SOUND OF BELLS.

We sent one of our steel bells weighing 800 lbs. to the western part of this state, and received word from the purchasers that it could not be heard two miles. Having an order from Ohio for a bell of the same size, we gave directions to have this bell forwarded to fill the order. The Ohio purchasers wrote us that the bell could be heard eight or ten miles.

COST OF BELLS TO NEW YORK CITY.

The cost of renewing bells in the place of those broken in the city of New York is $20,000 per annum. And for the last year it will amount to $40,000. When the clapper strikes in one place, if the metal is too soft a hole is soon beaten through, and if the alloy is two hard the bell will be cracked. Several efforts have been made to prevent the clapper from beating in one spot. One plan is to have the bell slowly revolve, another is to have the clapper revolve around the axis of the bell. This plan has been successful, increasing very considerably the durability of the bell.

EFFECTS OF TEMPERATURE ON CASTINGS.

When we cast eight or ten bells from the same reservoir of metal, we find that the one cast first has a different tone and quality from the one cast last, and this is doubtless due to the gradual cooling of the metal. I am trying to make a pyrometer to measure the temperature of our metal in order to obtain a more uniform quality of bell. If the metal is too hot when the casting is made the bell will be brittle, while if it is not as hot as it should be it will not be closely and firmly united.

The time of adjournment having arrived Mr. Harrison promised some further remarks at the next meeting.

## Torpedo Guard.

An effectual guard to the gunboats liable to be attacked by torpedoes has been devised. It consists of a net suspended from a spar lashed athwart the bowsprit. The lower edge of the net is some distance under water, and has a line rove through it, attached to which are shot to sink it to any required depth.

To find the solid contents of a cone, multiply one-third of the area of the base by the hight.

A TUBE twelve inches diameter and twelve inches high holds 5.875 United States gallons.

## REMINISCENCES OF GLASS-BLOWING.

Messrs. Hurd and Houghton, of No. 401 Broadway, New York, have published a little book of 116 pages by Deming Jarves, entitled "Reminiscences of Glass-blowing." It is written in a very pleasant, readable style, and a good idea of its contents may be obtained from the following extracts.

CURIOUS ACTION OF A GLASS ROD.

"Place a tube, say two feet long, before a fire, in a horizontal position, having the position properly supported, say by putting in a cork at each end supported by pins for an axis; the rod will acquire a rotary motion round the axis, and also a progressive motion towards the fire, even if the supporters are declined from the fire. When the progressive motion of the tube towarde the fire is stopped by any obstacle, the rotation is still continued. When the tubes are placed in nearly an upright position, leaning to the right hand, the motion will be form east to west; but if they lean to the left hand, their motion will be from west to east; and the nearer they are placed to an upright position the less will be their motion either way. If the tubes be placed on a sheet of glass, instead of moving towards the fire they will move from it, and about the axis in a contrary direction from what they did before; nay, they will recede from the fire, and move a little upwards when the plane inclines towards the fire."

SOME PROPERTIES OF GLASS.

"Glass resists the action of all acids except the 'fluoric.' It loses nothing in weight by use or age. It is more capable than all other substances of receiving the highest degree of polish. If melted seven times over and properly cooled in the furnace, it will receive a polish rivaling almost the diamond in brilliancy. It is capable of receiving the richest colors procured from gold or other metallic coloring, and will retain its original brilliancy of hue for ages. Medals, too, embedded in glass, can be made to retain forever their original purity and appearance.

"Another singular property of glass is shown in the fact, that when the furnace, as the workmen term it, is settled, the metal is perfectly plain and clear; but if by accident the metal becomes too cool to work, and the furnace heat requires to be raised, the glass, which had before remained in the open pots perfectly calm and plain, immediately becomes agitated or boiling. The glass rises in a mass of spongy matter and bubbles, and is rendered worthless. A change is howeffected by throwing a tumbler of water upon the metal, when the agitation immediately ceases, and the glass assumes its original quiet and clearness."

ANTIQUITY OF THE ART.

"All writers on the subject of glass manufacture fail to show anything decisive upon the precise period of its invention. Some suppose it to have been invented before the flood. Nervi traces its antiquity to the yet problematical time of Job.

"The first glass-houses, well authenticated, were erected in the city of Tyre. Modern writers upon the subject generally refer to Pliny in establishing the fact that the Phœnicians were the inventors of the art of glass-making. The tradition is that the art was originally brought to light under the following circumstances. A vessel being driven by a storm to take shelter at the mouth of the river Belus, the crew were obliged to remain there some length of time. In the process of cooking, a fire was made upon the ground, whereon was abundance of the herb 'kale.' That plant burning to ashes, the saline properties became incorporated with the sand. This causing vitrification, the compound now called glass was the result. The fact becoming known, the inhabitants of Tyre and Sidon essayed the work, and brought the new invention into practical use. This is the tradition: but modern science demonstrates the false philosophy, if not the incorrectness, of Pliny's account; and modern manufacturers will readily detect the error, from the impossibility of melting silex and soda by the heat necessary for the ordinary boiling purposes.

"It is a well-authenticated fact, however, that there were whole streets in Tyre entirely occupied by glass-works; and history makes no mention of any works of this character at an earlier period than the time mentioned by Pliny.

"It was during the reign of Nero, so far as we can discover, that the first perfectly clear glass, resem-

bling crystal, was manufactured. Pliny states that Nero, for two cups of ordinary size, with handles, gave six thousand sestertia, equal in our currency to about two hundred and fifty thousand dollars; and that rich articles of glass were in such general use among the wealthy Romans as almost to supersede articles of gold and silver.

"It is not strange that the strict secrecy with which the business was conducted in the Middle Ages should have invested the art with an air of romance; and legends, probably invented for the purpose, created a maximum of wonder among the uninitiated. The government of Venice also added, by its course, to the popular notions regarding the high mystery of the art, conferring, as it did, the title of 'Gentleman' (no idle title in those days) on all who became accomplished in the manufacture. Howell, in his 'Familiar Letters,' dated from Venice in 1621, says :—'Not without reason, it being a rare kind of knowledge and chemistry, to transmute the dull bodies of dust and sand, for they are the only ingredients, to such pellucid, dainty body as we see crystal glass is.'"

GENTLEMEN GLASS-BLOWERS.

"A French writer, who published an elaborate work in twelve books upon the subject of glass manufacture, after it had been introduced into France, gives an interesting account of the rise and progress of the art in that country, the encouragement it received, and the high estimation in which it was held. After stating that it was introduced in France from Venice, he says :—

"'The workmen who are employed in this noble art are gentlemen, for they admit none but such. They have obtained many large privileges, the principal whereof is to work themselves, without derogating from their nobility. Those who obtained these privileges first were gentlemen by birth; and their privilege running, that they may exercise this art without derogating from their nobility, as a sufficient proof of it, which has been confirmed by all our kings; and in all inquiries that have been made into counterfeit nobilities, never was any one attainted who enjoyed these privileges, having always maintained their honor down to their posterity.' Baron Von Lowhen states, in his 'Analysis of Nobility in its Origin,' that 'so useful were the glass-makers at one period in Venice, and so considerable the revenue accruing to the republic from their manufacture, that, to encourage the men engaged in it to remain in Murano, the Senate made them all Burgesses of Venice, and allowed nobles to marry their daughters; whereas, if a nobleman marries the daughter of any other tradesman, the issue is not reputed noble.'"

## FARMERS' CLUB.

The Farmers' Club of the American Institute held its regular weekly meeting at its Room at the Cooper Institute, on Tuesday afternoon, Feb. 28, the President, N. C. Ely, Esq., in the chair. From the proceedings we select as usual such portions as we suppose will interest any considerable number of our readers.

A HYBRID OAK.

Professor David Christy presented the acorns and dried leaves of eleven species of American oaks. One of these was the Leana, and Professor Christy remarked that for a long time it was supposed that there was but one tree of the species in existence, but recently a second specimen had been found. It was suspected by botanists to be a hybrid product of the Black oak crossed with the Laurel oak, and this suspicion is now confirmed. A gentleman in Cincinnati planted the acorn, and the leaf of the young tree bears a much closer resemblance to that of the Black oak than it does to that of its parent Leana. As it is a general law that hybrids do not perpetuate their own kind, but tend constantly to return to one or the other of the parent species from which they were derived, it is now considered as settled by this experiment that the Leana is a hybrid.

ARTIFICIAL HONEY COMB.

Mr. Steel presented a specimen of pressed wax from Switzerland, where it is manufactured in large quantities for use in bee-hives, to guide the bees in the construction of their comb. In many kinds of hives it is desirable to have the comb constructed in parallel sheets, and in certain directions, and numerous plans have been tried to induce the bees to conform to this arrangement. The Swiss are probably in advance of all other nations in the management of the honey bee, and they have discovered an effectual method of guiding them in laying out their sheets of comb. A thin sheet of wax is pressed full of indentations corresponding in form to the base of the cells, and is then suspended from the top of the hive in the position at which it is desired the central sheet of comb should be built. Mr. Steel stated that this plan is perfectly successful, and that he had purchased, at considerable cost, one of the machines for pressing the wax, thinking there might be a demand for the article among our bee growers.

EFECT OF COAL ASHES ON WOOD ASHES.

Mr. Solon Robinson read a letter to the club saying that the writer had observed that the ashes of hard coal mixed with wood ashes entirely destroyed the value of the wood ashes for making soap. It would be interesting to have this statement tested by careful experiment.

### Invention of the Revolving Horse-rake.

There seems to be many claimants for the honor of inventing this useful tool. We find the following letter in the *Rural New Yorker* :—

"I am well acquainted with Mr. Hunt, the principal claimant, as he formerly resided in Bridgewater, and was my neighbor for twenty years or more, and am perfectly familiar with the circumstances of the getting up of his rake. I also know that there is but little resemblance in appearance, and, in fact, none at all in the working of his rake, to the one now so generally in use. Hunt was a farmer and I a mechanic; between us we got up the rake for his own use as a farmer, but for which he obtained a patent, No. 104, Dec. 10, 1836, I making the first scratch on, and taking the last chip from the original one manufactured. Two years after, the rake now so extensively used in the Eastern, Middle, and Western States, was invented, in Bridgewater, by myself. When it was brought out, the one for which Hunt obtained a patent was cast aside, not one having been used for the last twenty years or more, I will venture to say. Let Mr. Hunt produce a drawing or description of his rake, to show how it will compare with the one now in use, and surely no sane man can call them nearer relatives than fifth cousins, unless, like Polonius, he is bound to see that the cloud looks 'very like a whale.' I can prove, by living witnesses, the statement above made, and also that my invention was recorded at the right time and place, though no patent as yet has been taken out for it.

"ALBERT BROCKNY.

"North Bridgewater, Oneida Co. N. Y., 1865."

### Potash by the Cartload.

The Carson, California, *Post*, says,:—"Yesterday Asa Kennedy came into Carson with a load of potash collected from a bed of that material near the Sink of Carson, for Duff & Co's soap factory. Samples of the article had previously been sent in and tried, giving entire satisfaction. In other countries this article is the result of time and labor. Here a man has but to drive his team on to the bed and shovel up a load. The same is the case with salt, saltpetre, alum, sulphur, and numerous other articles that might be mentioned, useful in the arts and trade. Thus far almost every article, except coal, required for the reduction of our ores, is found in abundance within our own limits, or at least the material from which to manufacture it. Nature has certainly furnished our barren unsightly land, bountifully, and yet we have hardly looked into her resources. Future developments, we confidently believe, will show an abundance of coal, and possibly nature may have provided, somewhere in our mountains, springs of niter and sulphuric acid."

PREJUDICE AGAINST MACHINERY OVERCOME.—In the course of a speech made at a late meeting of a farmers' club in England, Lord Palmerston said:—"A few years since the flailmen thought that the thrashing machine would take the bread out of their mouths, and the thrashing machines were destroyed in consequence of this jealousy of the flailmen. The other day when I was down in Hertfordshire, I was told by a farmer that the laborers now considered the flail too severe an employment, and that they would not thrash with the flail, but only by machinery."

## Correspondence

### Material for Heavy Ordnance.

MESSRS. EDITORS:—In publishing my letter in the SCIENTIFIC AMERICAN of Jan. 9, on pages 19 and 20, you added a note in which you took exceptions to my statement that *cast iron* was *not the best* material for cannon, and added that "the problem in regard to the best material for heavy ordnance is not yet definitely solved."

In the number published Feb. 25, you have an editorial article on this subject in which you say that "Within a few years [past] the Russians and Prussians, and perhaps the English, have made a stride in advance of us. *This has been effected by the use of a better material than that which we employ.*"

It seems to me that this last admission or statement—especially when backed up by the recent failures of the Parrott and other cast-iron guns, by the report of the Senate Committee pronouncing them unsafe and unreliable, and recommending the substitution of Ames wrought-iron guns, and still more the testimony of the Ames gun itself on trial—ought to be, if not conclusive, at least tolerably satisfactory on this point.

In this matter, as in that of "breech-loaders," I have not the slightest pecuniary interest; but I do feel anxious that the Government should avail itself of every possible advantage by the adoption of the strongest and best weapons. W. C. DODGE.

Washington, D. C., Feb. 24, 1865.

### To Stain Wood Black.

MESSRS. EDITORS:—Having seen in the last week's issue of your journal the answer to some one's query how to stain wood black, I take the liberty to send you a simple and very cheap black stain, which I have many times used. I take extract of logwood and put water enough with it to dissolve it, and heat boiling hot, and apply to the wood while hot some three or four times, letting each coat dry; then I give it a good coat of acetate of iron, which I make by putting vinegar upon iron chips. This produces a perfect jet black. GEO. W. BLISS.

Springfield, Mass., Feb. 27, 1865.

[Extract of logwood and acetate of iron mixed together make black ink. It may be better to make the ink in the wood than to make it first and then soak the wood in it. We suppose green vitriol—sulphate of iron—would answer as well as the acetate, and the extract of nutgalls, or of oak bark, or of sumac, as well as the extract of logwood.—EDS.

### Shoe Blacking.

MESSRS. EDITORS:—Will you be so kind as to inform me, through the SCIENTIFIC AMERICAN, the different ingredients Mason's shoe blacking is composed of, and the relative proportions of the same? Also whether a mill is used for mixing the same?

S. T. F.

New Brunswick, Feb. 16, 1865.

[As a good blacking for shoes and boots is in universal request we give the following recipes. Whether "Mason's" is so made we cannot say.

*Polish without friction.*—Gum-arabic, 1 ounce; lump sugar, ½ ounce; ivory black, ½ ounce; water enough to make it easily applied with a sponge. Dissolve the sugar and gum, and grind the black on a slab with it. No friction required.

*Paste Blacking.*—Ivory black, 1 pound; molasses, 12 ounces; vitriol, 1 ounce; sweet oil, 2 ounces. Mix the black and molasses well; add the oil, and by degrees the acid; as much water afterward as may be thought necessary to give the proper consistency.—EDS.

### Cast-iron Floating on Cast-iron.

MESSRS. EDITORS:—You will confer a great favor on a few of your subscribers in this place if you will inform us by what law of physics it is that a solid piece of iron will float on molten iron. Yea, more, if the solid piece be pushed to the bottom of a mass of molten iron it will rise to the top, like a piece of wood in water. At first, we thought its specific gravity was lighter, but then we found by experiment

that iron as it changed from a molten to a solid condition was contracted, and hence its specific gravity must be greater in a solid than in a molten form.

C. F. H.

Pekin, Ill., February 21, 1865.

[It is stated in the books that cast-iron expands in the act of hardening, and then shrinks as it cools to a smaller volume than it filled in the molten state. If this is correct solid cast-iron of very nearly the temperature of the molten metal would float on the latter, while if it were cold it would sink. The expansion is doubted by some good observers, and it is perhaps open to further investigation. Care should be taken that the solid iron should inclose no cinders, coals, or other substances of less specific gravity than iron. Many high authorities say that any metal, solid, will float upon a mass of the same metal melted. But Professor Everett, of this city, tells us that he made the experiment with lead a short time since, and if he used a bar containing no dross or other impurities it would invariably sink. Perhaps some of our correspondents will make the experiment in the same careful manner with other metals, and communicate the result.—Eds.

### The Mechanical Problem Tried.

Messrs. Editors:—By way of settling the problem of "The Two Wheels" we have made the experiment.

The cylinders used were 2·35 inches diameter by 5 inches face, and precisely equal in weight. One was a disk of poplar 2·05 inches diameter, surrounded by a ring of brass, .15 inches thick. The other a disk, 2·35 in diameter, whose center was occupied by a cylinder of brass, in weight equaling the ring.

The inclined plane was at first the hypothenuse of a triangle, whose base and perpendicular were respectively 3 feet and 6 inches. It was afterward varied, and in some cases the horizontal plane was also elevated to various hights.

A simultaneous start was allowed, by placing the wheels against an edge and removing this quickly.

The result was in all cases the same. The wooden rim acquired a higher velocity. The relative motion of the wheels upon the horizontal plane was the reverse of that upon the inclined. On the inclined the wooden rim gained on the brass; on the horizontal, vice versa. The wheels reached the same relative positions, though not at the same time. In the first position of the inclined plane the brass rim was 12 to 14 inches behind when the wooden rim reached the horizontal.

If the wheels were free to slide down, their maximum momentum would be similar—the same weight by the same velocity. Being forced to revolve, gravity finds a reservoir in the center of oscillation. If this lies in the axis of rotation, the weight being condensed into a mathematical line, the case is the same as sliding down; the time of descent is then a minimum and the speed a maximum. In proportion as the center of oscillation is distant from the axis so does the time increase and the speed decrease. As the center of oscillation in the wooden rim is at a distance from the axis it takes longer to roll down than it would to slide. In the brass rim this is still more apparent.

The momentum of the wheels on reaching the horizontal are equal though compound, being expressed by velocity of axis multiplied by weight, added to velocity of center of oscillation multiplied by weight. To destroy both motions the resistance must act on a point between the axis and center of oscillation, the center of oscillation being taken in a diameter perpendicular to the inclined plane.

J. Burkitt Webb.

Bridgeton, N. J., Feb. 28, 1865.

### A Demand for Small Inventions.

The following complimentary letter from Mr. Bleyer, whose engraving appeared on page 126, speaks for itself. It confirms our oft-repeated assertion that there is a great demand for small inventions:—

Messrs. Munn & Co.:—I received the box containing papers, model and engraving, in good order. I am much pleased with the engraving and accompanying description. Truly everything that is done through the Scientific American Patent Agency is well done.

Although well aware of the value of the Scientific American as a medium for introducing inventions, I had no true conception thereof, and find myself agreeably surprised at its influence in that direction. It is now a little over a week since the engraving appeared, and I am already "up to my elbows" among orders, etc., from all quarters. Your Agency will always receive the commendation of

Buffalo, Feb. 28, 1865. H. W. Bleyer.

### Coppery Fruits and Vegetables.

The Analytical Sanitary Commission of the *Lancet* have just published a report on the presence of copper in articles of consumption, which reveals a very unsatisfactory and reprehensible state of things connected with the preservation of certain fruits and vegetables for winter use. It appears that the practice of "greening" with the poisonous salts of copper is still continued by many British and foreign houses, and that in one class of articles largely consumed in hotels and restaurants, viz.: peas and beans preserved in air-tight metallic cases, uncolored samples are but rarely met with. The principal salts of copper detected by the Commission were the acetate and the sulphate—the first having been probably formed by the action of the acetic acid in the vinegar used upon the copper of the vessels in which the pickles had been prepared, and the second, known as "blue stone," having been directly introduced into certain articles preserved without vinegar.

Of thirty samples of peas and beans and mixed vegetables preserved in tin cases, twenty-five were found to contain copper, generally in the form of sulphate. The five samples found to be genuine and of the natural color, were the peas obtained from Lazenby & Son, labelled "John McCall & Co.;" from Ball & Son, labelled "Thre. Rolland;" and both the peas and beans procured from Crosse & Blackwell, labelled respectively "Phillippe and Canaud," and "Thre. Rolland, au Mans."

Of nine samples of pickles tested, five contained acetate of copper, and four were entirely free from that salt. The uncolored samples were French beans and gherkins, from Burgess & Son; and mixed pickles and gherkins from Crosse & Blackwell.

Of the three samples of bottled fruits examined, all contained copper, most probably the sulphate.

Some idea of the enormous consumption of pickles and preserved vegetables of different kinds, and consequently of the importance of the presence or absence of copper, may be gathered from the following statistics of the sales of a large firm in the year 1864: Pickles, 216,000 gallons, of which 104,000 consisted of gherkins, beans and cucumbers; West India pickles, and sold as imported, 2,800 gallons. Bottled fruits for tarts, 35,000 dozen quart bottles, of which 17,000 dozen consisted of gooseberries, greengages, plums and rhubarb. Philippe & Canaud's peas and beans: peas, 10,600 tins; beans, 1,700 tins.

We are grateful to the Analytical Sanitary Commission for the information they have supplied, but we cannot help thinking that the adulteration of each sample ought to have been more precisely defined. Such expressions as "very much copper" and "rather much copper" are too vague for an important analytical report. The tests relied upon were: the bluish color of the ash when entirely freed from carbon, the blue color obtained with ammonia, and the deposition of pure metallic copper on a polished iron rod placed in an acid solution of the ash. As qualitative tests these are highly characteristic, but as quantitative tests they are useless.—*London Chemist and Druggist.*

### Covering old Bed-quilts.

Now that cotton is scarce and high, it seems more than ever necessary that old bed-quilts should be saved to cover, line and quilt over again. After being well cleansed in two or three warm suds in a pounding barrel and rinsed, hang up to dry till ready to iron smoothly. When ready to quilt, first tack your lining to four quilt frames so that it will be smooth; then spread on the old quilt and baste fast to the lining or frames; over this spread the outside, and fasten the edges, having all parts smooth. The cotton is kept in place by the quilting in the old quilt. It is not necessary to put as much work on the new quilt. A lady who quilted one thus, about three inches apart, put it on, quilted, took it off and bound it in two days, doing all the work herself except assistance in rolling. And she had a thicker, warmer quilt than the old one

### Miscellaneous Summary.

Communication with San Francisco direct.—On Sunday morning at three o'clock the wires of the Western Union Company were connected with the Pacific lines and communication established direct between this city and San Francisco. Though the weather was bad, rain falling at the time at many points on the route, the wires worked well, and a considerable amount of business was transacted. The distance is nearly four thousand miles, and the difference of time about four hours. This is unquestionably the longest circuit ever worked, and the fact that such length of wire was telegraphed over in one circuit is a notable era in the history of telegraphing.

Launched Ready for Sea.—A new screw steamer was launched, complete in every detail except her armament, from the shipyard of Mr. Donald McKay at East Boston on Wednesday afternoon. She is named the Yucca, is 145 feet long, 24 wide, and 11½ deep, with 12 inches dead rise at half floor. Her cylinder is 33 inches in diameter, with 30 inches stroke, applied to a propeller 9 feet in diameter, with 4 blades and 16 feet pitch. It is expected that she will steam from 12 to 14 knots in smooth water. It is not usual to launch vessels in this way, though in some instances it is done where time is an object.

The experiments now being made at the Clinton paper-mills, Steubenville, N. Y., to manufacture printing paper from corn husks, by the Austrian patent, are progressing very favorably. The pulp produced from the husks is as white as the driven snow, and said to be equal in appearance to pulp made from cotton or linen rags.

The Russian Serfs.—The London *Morning Star* says, that while the Russian serfs before emancipation were calculated to have consumed about eighteen shillings worth of cotton goods per head, that amount has already risen to one pound seven shillings per head over the 22,000,000 of emancipated peasantry.

It is a curious feature of the recent general election in Australia, that female householders voted, the new electoral act having conferred the franchise on them without intending it. The Melbourne papers say that the ladies exercised their new privilege with dignity and discretion.

A recent order of the War Department directs the issuing of a ration of fish, namely, fourteen ounces of dried fish, or eighteen ounces of pickled fish, to be made to the troops once a week, in lieu of the rations of fresh beef.

In France the fancy for collecting postage stamps has been called "Timbromania." The word seems to have given umbrage to the fair collectors of these curiosities, and the word to be used in future is "Timbrophilee."

R. K. Abbot, of West Concord, N. H., is drawing wood upon a sled with wooden runners, the forward set made 40 years ago, and the hinder one 35, and in constant use every winter since.

They have on exhibition at a Workingman's Association in London, an alarm clock which, on striking the hour appointed, lights a lamp and boils a pot of coffee or tea while the workman is dressing.

Rimmel, a prominent London perfumer, has published a treatise on odors and perfumes, and one original feature of the book is, that a delightful fragrance is perceptible in the binding.

Patent Law in Liberia.—The Legislature of Liberia, which adjourned on the 2d of January, passed during the session a patent law. The fees for citizens are $25; for aliens $50.

A factory in Boston has a calliope through which the escaping steam plays a cheerful tune to call the workmen together.

The total amount of national currency in circulation up to Saturday last was $87,288,300.

The corporations in Newburyport have a million and a half yards of cotton cloth on hand.

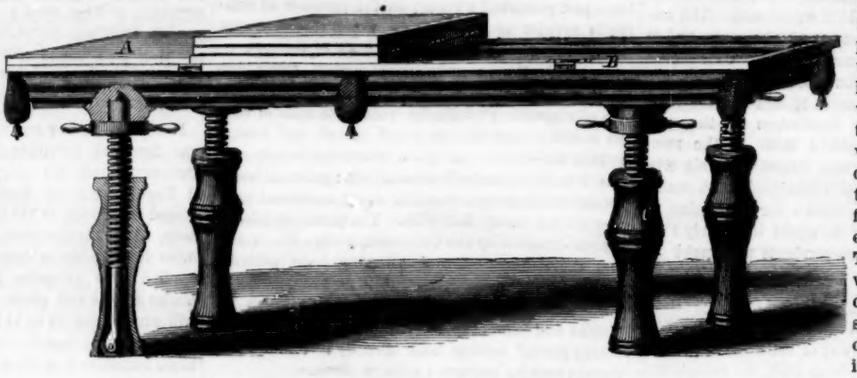
Cotton has fallen nearly fifty per cent, and there is a marked decline in cotton fabrics.

The cube of the diameter of a sphere multiplied by ·5236 will give the solid contents.

The consumption of ice in Philadelphia last year was one hundred thousand tuns.

### Combination Billiard and Office Table.

This table is intended to do duty as a billiard table or as a table for any other purpose, to afford the lovers of this agreeable and innocent amusement the means of gratifying their tastes at their own homes at a comparatively trifling expense, and be available for domestic uses as well. The bed and cushions are the same as those on the ordinary billiard tables ; it is, in addition, fitted with a removable cover, A; the frame of the tube, B, made of wood or iron is not so deep, but is more compact and quite as strong as the old billiard table; economizing space enough thereby to enable persons to sit at the table with their knees under it without having the table higher than the ordinary house table. By means of the screw in the adjustable leg, C, the casters are drawn up and the table made to stand solid, and at the same time the table is elevated to the required hight for the purposes of the game, and leveled by the spirit levels in the sides of the frame. The table is thus converted into a billiard table by raising and leveling it and removing the cover, A. The table will be manufactured of different sizes, varying from the French carom down to Phelan's smallest table, which will be found the appropriate size for home use, both carom and with pockets in the corners. Manufacturers wanted in all the large cities. For further information address J. D. Bradley, No. 315 G street, Washington, D. C.



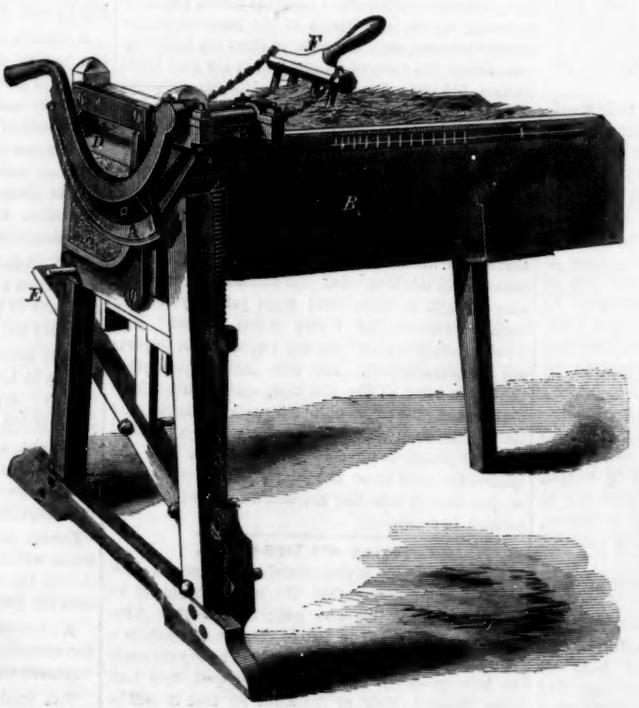

BRADLEY'S COMBINATION BILLIARD AND OFFICE TABLE.

### Improved Hay Cutter.

Chopped feed is found to be more easily digested, and consequently healthier for stock than hay in bulk, and many ingenious machines have been contrived to cut up the hay with the expenditure of the least time and power. The engraving published herewith illustrates a hay cutter which is easily operated and claimed by the inventor to be exceedingly efficient. The novel features consist in the attachment of the knife, A, with reference to the feed trough, B. This trough is provided with an iron plate, C, against which the knife works closely, thus forming a shearing edge which very much assists in severing the hay. As the cutting edges wear provision is made for moving the knife back so that it always works closely against the iron plate. The material to be cut is confined by the clamp, D, which is worked by the treadle, E, and the fork, F, is convenient for distributing the hay evenly before being operated on. This machine is also useful for cutting tobacco or other substances that require to be shred finely.

The inventor says:—"The advantages of a spring treadle are very great, and the utility, durability and cheapness of the Nonpareil Feed Cutter meets the wants of those who wish to save time, money and labor. This machine cuts the feed to any length required, without choking or slipping over it. The inner face of the knife being slightly concave, causes less friction and permits the edge of the knife to whet itself against the flange of the mouth plate, thereby giving it a keener edge."

Patented on the 13th of December, 1864, by Jacob Doerksen, of Derry Church, Pa. The entire right is for sale on very liberal terms. For further information address H. A. Earhart, Palmyra, Lebanon Co., Pa. All persons writing after the 1st of April next, should send their letters to Elizabethtown, Lancaster Co., Pa.




DOERKSEN'S NONPAREIL HAY CUTTER.

### HOT-BEDS.

It is the season of the year for making hot-beds, and thousands of mechanics who cultivate gardens would doubtless employ this means of enjoying the luxury of early tomatoes and cabbages if they knew how simply and easily a hot-bed can be made. The foundation is a bed of horse manure, two or two and a half feet deep, and of any desired size, say five by eight feet. Four rough boards are nailed together to form a box, without top or bottom, and somewhat smaller than the bed of manure, say four by six feet. This is placed on the manure bed, filled with good soil to the depth of six inches, and covered with window glass. The box should be made sloping toward the south, the north side about fifteen inches in hight and the south side about eight inches. It is better to have the sash made with bars running only one way across the box, and rabbeted so that the panes of glass may be laid on in the manner of shingles; but any old window sash will answer the purpose.

If the manure is very dry it should be well sprinkled with water as it is piled. In two or three days the soil will become warm, when the seeds may be planted, and it is surprising with what vigor they will sprout and grow. In hot days the sash should be raised a little at one edge; the soil should be frequently watered and kept free from weeds. If a man once tries a hot-bed he is not likely to dispense with it afterward.

### The Cashmere Goat.

Israel S. Diehl, Esq., late United States Consul at Batavia, communicates to the Report of the Agricultural Department a long article on the goat, from which we extract the following:—

"This variety of the wool-bearing or 'shawl goat,' as it is often called, is spread over Thibet, Northern India and the regions to the east of the Caspian sea. It is somewhat smaller than the common and Angora goat; it has straight, round, pointed horns, pendant ears, is covered with straight and falling, long, fine, flat, silky hair, with an undercoat in winter of a delicate greenish wool, of but two to three ounces to each, which latter alone constitutes the fabric from which the celebrated shawls are made. Ten goats only furnish wool enough for a shawl one yard and a half square; but even this is often found differing both in color and the quality of the wool, or rather the fine hair of which the fleece is composed. The principal points in the most approved breeds are large ears, the limbs slender and cleanly formed, the *horns not spirally twisted*, and, above all, the fleece being long, straight, fleecy and white.

"Besides the true Cashmere and Thibetian breed from which originally the celebrated Cashmere shawls were made, there are several others which have been employed for the same purpose in different parts of Thibet, India and Tartary. The Tartar half-breed has been found to survive well in a colder climate, and has been introduced into France with considerable success, as also those from the Ghengis and Caspian.

"The shawls still most in request, however, are brought from the Kuyam of Cashmere, where 16,000 looms are constantly at work, employing three men to each, manufacturing and disposing of thirty thousand shawls annually.

"Hodgson, in speaking of this goat, alludes to it as 'a variety of the common domestic goat, known as shawl goat, of Thibet and Cashmere, and they are called, including its relative, the goat of Angora.' 'From earliest time the hair or fine under-down of this goat has been used in the manufacture of tissues or textile fabrics, especially in Eastern Europe and Western Asia,'

"The long-eared Syrian goat, to judge from the specimens we have seen, is only a variety of the Thibetian and Angora breeds, having long hair, with a fine under-coat like the former, but neither so abundant nor so fine as the Angora. In ancient times, when the goat divided the palm of usefulness with the sheep, the Syrian goat was no doubt superior to what we now find it in Palestine or Syria, so far as its hairy produce is concerned."

ANTIMONY VERSUS PETROLEUM.—A company engaged recently in boring for oil in Wirt county, West Virginia, struck a rich vein of antimony, a rare and expensive metal, in great demand for type-casting. The sum of $350 per tun was at once offered for all the discoverers could supply, and at these rates their profits will rival those of the silver mines of Washoe, and the oil wells of Venango.—*Pittsburg Chronicle.*

CHICAGO pays $100,000 a year for hand labor in grain shoveling. It is now proposed to save time and labor by employing machinery for this work.

THE

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VOL. XII. NO. 11...[NEW SERIES.]....*Twentieth Year.*

NEW YORK, SATURDAY, MARCH 11, 1865.

**Contents:**

(Illustrations are indicated by an asterisk.)



## BORING STEAM CYLINDERS.

It is not surprising that the early makers of steam engines advanced slowly in constructing machines of great size, from the supposed impossibility of boring the cylinders when over certain diameters. Indeed, it is but comparatively few years since a cylinder of forty inches diameter was looked upon with as much respect as those of eight and nine feet in the bore now are. Until within fifteen years most of our large marine engine shops bored all their cylinders in lathes. This was the universal practice at that day, and until the vertical boring mill was erected the cylinders of steam engines were of a limited size and length of stroke, and were duplicated in order to get the requisite power for large vessels. Few double engines are built in this country at the present day, except those for screw propellers, compared to the number turned out formerly when steam cylinders were small and difficult to make.

All large cylinders are now bored in vertical mills. It is to this that they owe their rotundity, their exactness from end to end, and their uniformity of surface. But if any person imagines that a steam cylinder is as smooth when first bored as it becomes by wear, he is mistaken.

The finish imparted by the contact of two metallic surfaces moving in right lines under steam pressure is of a peculiar nature, and can not be imitated by any manipulation whatsoever. It is impossible to leave the interior of a steam cylinder in a condition approximating to the surface it acquires by working, and we, therefore, find in our large shops, where some of the best work is done, that no attempt is made to produce what might be called a dead smooth surface, but that the cutters are so ground as to engage with the metal as little as possible, or, in other words, to take light chips. So long as no palpable ridges are actually left, and the tool cuts, instead of tearing, the surface of the cylinders will be sufficiently smooth. It is also much more likely to be round and true where the tools cut free, instead of dragging. Many engineers declare that they prefer, of two evils, that the cylinder should be too rough rather than too smooth. In the first instance the packing rings suffer for a day or two until the surfaces have found a bearing; the ridges becoming filled with grease in the interim conduce not only to ease of motion but to the production of a true surface, and prevent cutting. With the cylinder bored too smooth at first scratching is more probable; from the intimate relation of the rings and the piston the tendency to tear away before they have been polished by wear is much increased.

Let us remark here that a cylinder or valve face once well polished by wear under pressure acquires a vitreous film, which resists a file or scraper; when it is once injured by cutting no such surface will form again until the cutting be stopped, and the two clean surfaces well lubricated are brought together again.

Steam cylinders are now of dimensions formerly unknown. The cylinders of the new Pacific mail steamers are 105 inches diameter; those of the *Achilles*, English iron-clad, are 112 inches, and Ericsson's hot-air engine, built some years ago, had cylinders 168 inches in diameter. To bore a cylinder 105 inches diameter face, both flanges and recess for the head, occupies about 200 hours. About three-eighths of an inch are allowed for boring out.

It is a common practice to bore small cylinders, say twenty or thirty inches diameter, in lathes. Where the head is not cast in, as it commonly is for screw engines, a cross is often inserted and the boring bar run through it. This is not a good plan, for the bar is apt to be cramped or bind in the cross and produce bad work. The better way is to have a large and stiff bar—the shorter the better—put in good tools that cut, and a slow speed and moderate feed kept on continuously until the work is done. Any intermission will make an inaccuracy in the bore, for even where no heating takes place, when the cutters are started from a state of rest they spring into the iron and make a ridge. A multiplicity of cutters is better than one. Three, at equal distances apart, work well, and if the cut is divided, each one working slightly behind the other, a good working face in the interior will be secured.

Grinding a cylinder with emery is the last absurdity any one conversant with steam machinery would suggest. It used to be done in old times, when slide valves were ground, but the two abuses have gone out of practice together.

## PROFESSOR BOWEN ON THE CURRENCY.

Professor Francis Bowen, of Harvard University, the author of perhaps the most learned work on Political Economy ever written, has published a plan for restoring our currency, essentially the same as that proposed by us last December. It will be remembered that we advocated the funding of $200,000,000, of the legal tender government notes by the sale of a corresponding amount of interest bearing bonds. The only difference between our plan and that suggested by Professor Bowen is, that while we would effect the change just as rapidly as the bonds could be sold, he would make it a gradual operation, extending over several months. Our respect for the opinion of Professor Bowen has led us to reconsider this point with all the earnestness and candor of which we are capable, but this reconsideration has only strengthened our conviction that it would be best to make the reform as quick in its action as possible. All the beneficial effects of the reform on the revenues both of the Government and the people would certainly be as great if it were prompt as it it were slow in its consummation, while the evils inseparable from so great a change in the business and life of the nation, it seems to us would be immeasurably less if the reform were made at a blow, than if it should be brought about by a lingering operation. Nearly all business men, especially those engaged in trade, would prefer a sudden to a slow reduction in prices. A prompt return to specie payments would make the nominal value of their stocks one half the amount that it is now reckoned, but it would place them in a position to go on in their business with absolute safety and certainty in their calculations. On the other hand, a gradual decline in prices would compel our merchants to sell their goods at cost or less, and thus to be doing business without profit throughout the period the reform was being effected.

It has been urged by the *Evening Post*, a paper that usually displays the greatest intelligence and ability in the discussion of financial questions, that any contraction of the government currency will be counterbalanced by a corresponding expansion in the currency of the national banks. But the notes of these banks are not merely redeemable by act of Congress in lawful money; their redemption is practically enforced by our clearing houses. Lawful money at the present time is government currency, and this money is now the basis of the bank circulation, the same as was gold in the good old days of specie payments. The bank note circulation has expanded with the expansion of its basis, and it would necessarily contract with the contraction of its basis. A withdrawal, therefore, of a portion of the government currency, so far from being counterbalanced by a corresponding expansion of the bank note circulation would be accompanied by a contraction of that circulation in the same proportion.

It is, however, probable that the discussion is of no practical importance, for, if the announcement be officially made, in such manner as to be believed by the community, that the currency is to be reduced to the specie standard, the effect on the prices of gold and other articles will be anticipated, and the fall will be as prompt as any parties can desire.

## IMPREGNABLE SHIPS OF WAR.

Captain Cowper P. Coles, the principal exponent and advocate in England of the only correct system for iron-clad ships—the monitor system—has written a letter to the London *Times* in which he expatiates upon the value of our iron-clads, and the general superiority of them, or the principle they represent, over those adopted by the English naval authorities. In relation to the monitors especially, their capacity to carry heavy guns in proportion to their tunnage and thickness of armor, Captain Coles says:—

"The smaller monitors are 1,034, and the *Monadnock*, although only 1,564 tuns, Admiral Porter says would destroy any vessel we have in the British navy. In this I cannot agree with the gallant Admiral—for I believe the *Royal Sovereign*, though but a conversion, if she had proper guns supplied to her, would be a good match for the *Monadnock*. On both sides of the water it appears to be now admitted that in the actual fight of ship against ship, the turret vessel must have great superiority.

"Our larger ships run up to 6,000 tuns, and we have no iron-clads approaching so small a tunnage as these monitors, except the *Research* and *Enterprise* (broadside vessels), which have not yet been tried in a gale of wind, and cannot attempt to carry their heavy guns."

The *Royal Sovereign*, alluded to by Captain Coles, is a turret vessel, and has been laid up and dismantled by the Admiralty Board. The same class which opposed the monitor system in this country and were defeated, have had better success in England, and, despite the representations and arguments of the leading mechanical journals abroad, have procured their suspension from service, and caused them to be laid on one side. Admiral Porter remarked in his official report that he would rather be on a wooden vessel and take what comes than be shut up in a monitor turret. To this Captain Coles tersely responds by saying:—"The gallant Admiral would have a better chance of telling his tale after fighting behind ten inches of iron in a turret than three feet of wood."

On this side of the water there have been two systems of iron-clads thoroughly tried—the broadside and the turret. The broadsides have been repeatedly smashed, broken in, boarded, and captured. Not a turret vessel has ever been penetrated or captured.

From the *Galena*, our first crude experiment, to the *Tennessee*, the last and best vessel of the Confederates, all have met a like fate, and not one floats that dares venture within range of a monitor.

### Improvement in Manufacturing Lumber.

Mr. Pearson Crosby, formerly of Fredonia, now of Brooklyn, N. Y., has for the last thirty years been engaged on inventions relating to sawing machinery, and obtained as the result of his ingenuity nearly twenty patents, as well as tangible pecuniary compensation.

By lumber manufacturers Mr. Crosby's improvements are highly valued ,and the largest manufacturers of lumber in this country, Messrs. Phelps, Dodge & Co., certify that the capacity of their mills has been greatly increased by the adoption of Crosby's plans. Those interested in this branch of industry should read the advertisement of Mr. Crosby on another page.

## TRANSPLANTING TREES.

In the course of the next two months many hundreds of thousands of trees will be transplanted from nurseries to orchards, most of them paid for at unusually high prices in the hope of obtaining remarkably luscious and valuable fruit. Some of the men who set orchards will lose from a quarter to a half of their trees, while others will lose hardly one in a hundred. A plan of setting, which will invariably give satisfactory results, is the following.—

After the ground has been richly manured and deeply pulverized, dig the holes of ample size to receive the roots in their natural position without bending. Then pour two pailfuls of water into the hole, and immediately begin to shake fine soil from a shovel into the water, continuing the operation gradually and steadily till the hole is filled. The hole should be filled around the outside in advance of the middle, in order to push the water inward to receive the earth about the central roots.

Fine earth gradually shaken into water in this manner is evenly deposited about the roots, surrounding and packing them as perfectly as if they had grown in their new position. This method of transplanting not only ensures the life and growth of the tree, but it is also easier than any other, and it further effects the very material economy of dispensing with the necessity of staking, the water settling the ground around the roots so closely as to hold the tree with sufficient firmness without any stakes. The tree, before it is set, should always be pruned of a part of its top, to balance the large portion of roots that are cut off in taking it up. If this be neglected, large parts of the branches will surely die, and there is great danger of losing the whole tree.

It is an excellent plan to mulch all orchards, and especially those newly set. The ground should be covered with the cheapest straw or hay to be had to the depth of four or five inches. This will not merely prevent the growth of weeds or grass, it will keep the soil both light and moist. If not mulched, it should be frequently stirred and kept clear from weeds. It is impossible to protect the roots of trees too carefully from exposure to the sun and air during their transfer from the nursery to the orchard.

## END OF THE GOODYEAR EXTENSION CASE.

Congress has adjourned without passing an act to extend the patent of Charles Goodyear for the vulcanization of india-rubber, and as the patent expires on the 15th of June next, before another session of Congress, its fate may be regarded as sealed. It is stated that large amounts of money have been expended by those interested in the patent to procure its extension, and it is a matter of public congratulation that the end sought was not accomplished. Let all laws be general in their operation. There is nothing in which the great public have a more universal interest than the defeat of all schemes which seek to enrich individuals or combinations by special acts of legislation.

### Undying Plants.

A letter from Guaymas, Sonora, Mexico, says:—"Passing on beyond Aribechi about two miles, we struck the bed of a stream through which we commenced our progress to another range of mountains whose slopes came down to the very edge of the channel way. It was here that we found the north sides of rocks which faced the stream covered with what at first seemed to be the most exquisitely beautiful green mosses that ever decked the rugged sides of a mountain. The entire sides of the mountain at this spot were blooming in the liveliest green. We dismounted to pluck some of these plants, and found that they were not strictly mosses, though undoubtedly they belong to that class of plants. Each one had separate roots firmly holding it to the rocks, and from these roots grew out a plant that opened to the diameter of a common tea-cup or a saucer, and spread itself flat on the face of the rock. The leaf somewhat resembles in texture the *arbor vitae*. These plants bear the name of *siempre viva*—always living, or always alive. Their peculiarity is to come out into beautiful green life in the rainy season, and then, when all moisture has deserted them, to turn as brown as autumn leaves, and roll or curl themselves up like a ball, as uninteresting to see as a brown stone, seemingly dead. But with the return of moisture, they uncurl their leaves and spread out again as beautiful and green as ever. Another peculiarity of the plant is that you may pluck it, throw it into your saddlebags, and keep it six months, and then place the roots in a cup or saucer of water when you retire for the night, and in the morning you will find by your side a lively green plant. It looks like magic. But I have tried it to my surprise and delight. The plant never dies—its life is immortal; and its beauty of texture and form and color are renewed or continue with the continued supply of moisture."

### Cost of a Gun Barrel Spoiled in Grinding.

The barrel-grinders at the water shops in the Springfield Armory all gave their two week's notice of quitting a few days ago. They had to pay $1.70 to the Government for every barrel they spoil in grinding, but lately ascertained that the authorities, on account of the large number of barrels spoiled in going through this process, had raised the sum to $2.78, this change to take effect from the first of January. The workmen claim that this is unreasonable, inasmuch as the quality of t e stock which has been used of late is much poorer than formerly, and that this and not their carelessness is in fault. If the disagreement is not adjusted some difficulty may be found in filling the places of the "strikers," as the job is by no means an easy one to learn, while it is notoriously unhealthy. There are now about three hundred and thirty thousand muskets at the arsenal. No shipment of arms has been made for several weeks, and there is no immediate prospect of any.—*Springfield Republican.*

### Heavy Rolled Iron.

The Phenix Iron Works have a heavy contract for the United States to furnish iron for iron-clad steamers. They roll eight inch square and twenty-four feet long, weighing about two tuns and a half, of the best iron. The like of this has never been done in this country. Each piece is perfectly straight, square and smooth. Heretofore the Government had its heavy iron forged. These works are in complete order for this kind of work; the gearings and fixtures are admirably arranged and in perfect order. This mass of iron, after it is heated, is drawn out of the furnace to the rolls, and after it has passed through the rolls several times, it is then drawn away to a saw and an end cut off, when it is straightened under a powerful screw press, and then drawn away to cool.

### Spring Bed.

By referring to this week's report of the patents issued at the Patent Office, it will be seen that G. W. Mitchell, of St. Louis, Missouri, has secured a patent for valuable improvements in spring beds. We have no hesitation in saying that it is a good improvement. The bed is simple, cheaply constructed, and durable, and dispenses with the heavy, cumbersome wood frame which is necessarily used in the old style spring beds. It is easily and quickly taken apart for the convenience of transportation, for carrying into small apartments, killing bugs, etc. The mattress which covers the springs forms part of the patent claims, and is filled on the sides and ends, and is attached to the slats by buttons and holes. When all together it presents a complete and beautiful bed.—[See his advertisement in another column.

### Reduction in the Caliber of Infantry Arms.

The board now in session at Springfield for the examination of small arms, have decided to reduce the caliber from 58-100ths and 54-100ths to 50-100ths of an inch, which diminishes the weight of the ball one-third, and reduces somewhat the weight of the gun.

STRAWBERRIES.—We notice strawberries in the windows of our Broadway saloons placarded $5 per basket. These baskets are about the size of a common tumbler, or half a pint, so that the fruit costs only $20 per quart. Six strawberries raised in Fitchburg were recently sold for a large dinner party in this city for $2.50. The six just filled one basket.

NEW THREE CENT COINS.—A law was passed by both houses of Congress during the closing hours to authorize the coinage of three cent pieces to be composed of copper and nickel.


### ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING FEBRUARY 28, 1865.

*Reported Officially for the Scientific American.*

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

**46,537.—Cultivator.—Wm. Bankson, Mt. Pleasant, Iowa:**

I claim the frame, F F, the lever, L, the suspension of the plows, 3 and 4, on bar, X, and the moving of them with the lever, N, when constructed substantially as described and for the purpose set forth.

**46,538.—Lamp.—Wm. W. Batchelder, New York City:**

I claim the combination of the safety or controlling devices herein described, with a lamp constructed and operating as herein described.

Second, The combination of the controlling conical screw, E g, with the cap, B, tube, C i, and lamp reservoir, A, all constructed and operating in the manner and for the purpose substantially as described.

**46,539.—Padlock.—Wilson Bohannan, New York City:**

I claim, first, So constructing a padlock that in the act of closing the shackle, B, this latter will release the hooked plate, d', from a toothed pawl, b, previously to locking, and still act upon the said plates, substantially as described.

Second, Receiving the hook, d, on the catch plate, d', in the act of closing the shackle, B upon the nose of this shackle, after said plate is released from the tooth, j, of pawl, b, substantially as described.

Third, So constructing the teeth, i j, on the pivoted plates, d' and b, that in the act of closing the shackle the latter will force the hook, d, backward, to receive the nose, c, substantially as described.

Fourth, The combination of the shackle, B, with its slotted nose and lever tooth spring pawl, b, with its tooth, j, catch plate, d', with its hook, d, and tooth, i, and the slotted tumbler or tumblers, g g', all arranged and operating substantially as described.

**46,540.—Corn Sheller.—Jacob Brinkerhoff, Auburn, N. Y.:**

I claim the bed piece, M, constructed as and for the purpose herein set forth.

**46,541.—Fence.—Marcus Brown, Fond du Lac, Wis., and Oscar J. Shannon, Fairwater, Wis.:**

First, We claim constructing a fence with posts having bevels, d d,, substantially as and for the purpose set forth.

Second, We claim the bands, e, or their equivalent, in combination with bevelled posts, a a', substantially as and for the purpose set forth.

**46,542.—Signal Box for Fire Alarms.—Charles E. Carpenter, Providence, R. I.:**

I claim a signal box, provided with an aperture to admit the finger, and having a diaphragm of paper or other suitable material extended across the inner mouth of the aperture, the position of the diaphragm being such that the signal knob or lever cannot be moved without breaking the paper.

**46,543.—Apparatus for Making Tags.—James B. Clark, Plantsville, Conn.:**

First, I claim the combination of the plates, y y and t t, substantially as herein described, for the purposes set forth.

Second, I claim the combination and arrangement of the punch, H, and plate, x, over which the folds of the tag are made, substantially as described and for the purpose set forth.

**46,544.—Seeding Machine.—Stephen D. Cook, Lima, Mich., and Henry J. Webb, Dexter, Mich.:**

We claim the employment of the rake, R, in combination with the "Shaking and Oscillating Seed-distributing Trough," T, operated substantially as and for the purposes specified.

**46,545.—File-cutting Machine.—John D. Crocker, Norwich, Conn.:**

I claim, first, The combination of the oscillating table which carries the file blanks, and gearing substantially such as described, so that the operation of cutting the teeth or burrs on the blanks may proceed both as the carriage is fed forward and backward, as set forth

Second, The combination of the contrivance, F, with oscillating bed, A', and reciprocating bed, A, substantially as and for the purpose described.

Third, Extending one end of the feed screw shaft, B, beyond the end of the bed, A', so as to constitute a handle, B', for enabling the operator to adjust the bed, A', longitudinally or laterally, at pleasure, substantially as described.

Fourth, Constructing the hammer with a concave face, in combination with a chisel stock, which is susceptible of being adjusted and set at different angles, substantially as described.

Fifth, So constructing a file machine that its file-supporting carriage can be adjusted after it has moved forward, to be fed backward, and during both of said movements the operation of cutting teeth or burrs on file blanks is performed, substantially as set forth.

Sixth, Cutting and setting file teeth or burrs on blanks, by means of a machine, which is constructed and operates substantially as herein described.

Seventh, Applying the chisel stock guide, J2, to a vertically adjustable slide or support, L, substantially as described.

Eighth, The chisel stock holder, J2, constructed to slide and swing, and also to guide and support the chisel, substantially in the manner described.

Ninth, Providing for adjusting the chisel to cut toward the operator, both in the forward and backward feed of the file carriage, substantially as and for the purpose described.

**46,546.—Machine for Amalgamating Gold and Silver.—Augustine B. Crosby, Boston, Mass.:**

I claim the application and use of copper plate or plates of any material placed at an inclination within the body of quicksilver.

I claim the application of a proportion of two or more of submerged copper or other plates to one slot of the slotted diaphragm, so as to produce an alternate action on each plate of the material passing through.

I claim the combination of A B C D E F and G, and of the several figures of the drawing, or any combination of them, for similar purposes.

I claim the application of one or more redivisions of the gold or other metal-bearing material in its passage through the quicksilver, in substantially the manner shown by the drawing.

I claim the application of copper or other metal amalgamated plates, in lattice arrangement, with or without riffles, as shown at J and M, of Fig. 1, substantially the same.

I claim the combination, or any similar one, of the parts shown in the drawings by the letters J K L M N and O.

I claim the general combination of all the above described parts, as shown by Fig. 2, or any similar one for the same purpose.

**46,547.—Clover Harvester.—Frederick Decker, Ostrander, Ohio:**

I claim the described combination of the knife, P, fingers, H, stripper, F G, and reel, L, all constructed and employed as and for the purposes specified.

**46,548.—Stave Machine.—C. J. Dibble, Farmington, Iowa :**

I claim, first, Giving an intermittent feed motion to rollers, c c, for feeding the block up to the work, by means of a spur, s, actuating a gage wheel, B3, on the pinion shaft, B', substantially as described.

Second, The combination of a pointed projection, p, on carriage, B, with the spurred slide, H, substantially as described.

Fourth, The combination of the spurred feed rollers, applied to head block, B2 B2, on carriage B, with the bevel wheels, b' b' b b shaft, B', and gage wheel, B3, operating substantially as described.

**46,549.—Manufacture of Iron and Steel directly from the Ore.—Charles M. Dupuy, New York City :**

I claim the combination of desulphurising, etc., and oxydizing, as herein set forth, with the process of deoxydizing, substantially and for the purpose specified.

I also claim the combination of the desulphurizing and deodorizing and carbonizing processes in the manufacture of steel, as described.

I also claim the combination of the desulphurizing and deoxydizing processes with the welding furnace, by which iron is manufactured at a low degree of heat, as set forth.

**46,550.—Wheel Cultivator.—A. P. Durant and D. M. Buckley, Atlanta, Ill.:**

We claim the plow frame, B B, when arranged under the main frame in front of the axletree, and the power applied directly thereto, and when attached, adjusted and operated in relation to the main frame, substantially as set forth.

**46,551.—Lubricant for Wool.—Benj. A. Earl, Philadelphia, Pa.:**

I claim the use of a combination of milk and borax as a lubricant.

**46,552.—Machine for Pouncing and Napping Hat Bodies.—Rudolph Eickemeyer, Yonkers, N. Y.:**

First, I claim attaching the pouncing and rubbing surfaces to a roller, or its equivalent, which has a movement upon a track or tracks, or pattern, parallel with the longitudinal profile of the rotating block upon which the hat is stretched, substantially as herein described.

Second, So applying and operating the shaft of the rotating hat block, and the roller, or its equivalent, to which the pouncing or rubbing surface is attached, that the one has a transverse motion relatively to the other, substantially as herein specified.

Third, The interposition of a cushion, P, of india-rubber or other elastic material, between the sand paper, l, and felt, u, or other pouncing and smoothing material, and the roller, J, or its equivalent to which such materials are attached, substantially as and for the purpose herein specified.

Fourth, A device for stretching the hat body upon the block, consisting of a system of hooks, all connected with disks, G, and F, or their equivalent, having a movement up and down, or lengthwise upon the shaft of the block, substantially as herein specified.

**46,553.—Machine for Stretching Hat Bodies.—R. Eickemeyer, Yonkers, N. Y.:**

First, I claim the employment, in the process of stretching hats, of a skeleton or ribbed and recessed former, substantially such as is herein described.

Second, The pressing ring, E, in combination with the skeleton or ribbed and recessed former, substantially as and for the purpose herein specified.

Third, The employment, substantially as herein described, in combination with the skeleton or ribbed and recessed former, of pressing rollers, K M, or other equivalent pressing devices, operating as herein set forth.

Fourth, The combination in a machine for stretching hats of a skeleton or ribbed and recessed former, a pressing ring, and a system of rollers or other equivalent pressing devices, the whole combined and operating substantially as and for the purpose herein specified.

**46,554.—Composition for Lining Barrels for Petroleum, Etc.—Lewis Francis, New York City.—Ante-dated Nov. 21, 1864 :**

I claim combining glue and glycerine with or without sugar, to form a new and useful composition, for the purposes specified.

**46,555.—Faucet for Oil or other Liquids.—James D. Frary, New Britain, Conn.:**

I claim as a new and improved article of manufacture a faucet made of iron, having the seating surfaces of the orifice and plug made of brass, or brass and iron, in combination with the crooked nozzle, c, screw or tinned shank, a, substantially as described.

**46,556.—Water Cooler and Purifier.—Abram J. Gibson, Cincinnati, Ohio, and George Emerson, Newport, Ky.:**

We claim a purifier, C, cooler pipes, D and E, and pipes, B and G, with faucets, F H and K, the arrangement and construction in combination as and for the purpose herein set forth.

**46,557.—Animal Trap.—Willard S. Gitchell, Peru, Ind.:**

I claim the combination of the two rotating radial platforms, b b, operated by means of the wires, i i, rock shafts, c c, and spring triggers, c c, and through the pulling of the bait from one hook, k.

**46,558.—Flexible Tubing.—Elliott P. Gleason, New York City. Ante-dated Feb. 5, 1865.**

First, I claim the spiral frame work of flat wire, substantially as described for the purpose specified.

Second, I claim a flexible tubing composed of a spiral frame work of flat wire or a flat metal strip and an impervious external covering, or both an internal and external covering, substantially as described.

Third, I claim the lubricating impervious covering of leather, substantially as described.

**46,559.—Hot-blast Pipe.—Carlos Glidden, Milwaukee, Wis.:**

I claim making hot-blast pipes substantially as herein set forth.

**46,560.—Amalgamator.—Alexander W. Hall, New York City:**

I claim an amalgamator consisting of a horizontal rotating cylinder with internal lifters, C C, a stationary perforated tube, or its equivalent, inserted through the hollow journals of the said cylinder for the introduction of the vapor of quicksilver thereinto, and a cock or valve, g, to regulate or control the pressure of the vapor within the said cylinder, the whole combined, arranged and operating substantially as herein specified.

**46,561.—Machinery for Crushing Quartz.—Alexander W. Hall and Daniel Bentley, New York City:**

First, We claim the taper vertical socket, c c, by which the axle or axles of the several rollers are attached to the central vertical shaft in such manner as to permit either roller to rise independently of the others, substantially as herein specified.

Second, Applying pressure to the several crushing rollers by means of a lever, c, and nut, d, or their equivalent, applied directly to the central shaft, and operating on all the rollers alike, substantially as herein specified.

Third, The spring, f, applied in combination with the collars, e g, washer, h, nut or bearing, d, and central shaft, A, substantially as and for the purpose herein specified.

**46,562.—Revolving Fire-arm.—Patrick Haughian, New York City. Ante-dated Aug. 28, 1864 :**

First, I claim the arrangement of the cylinder stop lever, C, to work in rear of the cylinder upon a fulcrum pin, c, situated behind the recoil shield and between it and the hammer, substantially as herein specified.

Second, The combination of the so arranged lever of the elbow form herein described and represented in figures 1 and 2, in combination with the within described arrangement of the spring, i, to operate upon a shoulder, k, above the fulcrum of the said lever, substantially as herein set forth.

Third, A spring-aided stop lever or catch arranged to work in rear of the cylinder and between the recoil shield and the hammer, in combination with a cam on the hammer, in the manner and under a mode of operation substantially as described.

**46,563.—Skate Feet.—Albert H. Hook and John H. Darlington, New York City:**

We claim a skate foot made of a block of elastic material so formed as to be attached to and detached from a skate runner in the manner and for the purposes herein set forth.

**46,564.—Device for forming Molds for Casting.—W. T. Horrobin, Biddeford, Maine :**

First, I claim the swiveled plate, I, employed substantially as herein described for presenting different patterns or parts of patterns to the flasks.

Second, I further claim the combination of the plate, J, rods, K, and sliding rod, G, for supporting the plate, I, in its operating position or elevating it to be reversed.

Third, In combination with the above, I further claim the retaining fork, L h, and groove, g, for preventing the disturbance of the plate, I, while in use.

**46,565.—Rake for Harvester.—Moses A. Keller, ———, Pa.:**

First, I claim the self-adjusting universal jointed shaft, with its jointed links, r m n and q o p, sliding disks, K K, constructed, applied and operating as and for the purpose set forth.

I also claim the arrangement, in combination with the stationary case, B, with its tripper flange, S, and guide slides, R T, of the cap and its flanges, I J, chambered bottom for covering the ratchet wheel, E, and containing the click spring connecting it to the gearing, all surrounding a central fixed shaft, F, arising from the bottom of the case, B, and operated by the beveled pinion, M, in the manner and for the purpose specified.

**46,566.—Mowing Machine.—John Jann, New Windsor, Md.:**

First, I claim the close vertical casing constituting the main frame to which the tongue, C, and bearings, b b, of the axle, B', are attached, constructed in sections, A A', inclosing the gearing, substantially as set forth.

Second, In combination with the above, I claim the gearing, F G I J, crank shaft, K, and pitman, N, the whole being arranged to operate in the manner and for the object set forth.

**46,567.—Paper Shirt Bosom.—Wm. E. Lockwood, Philadelphia, Pa.:**

I claim as a new article of manufacture a shirt bosom made of one or more pieces of paper, or paper and cloth, when made convex in front and concave at the back, for the purpose specified.

**46,568.—Fabric for Hats, Bonnets, etc.—Henry Lowenberg, New York City:**

I claim the use of canton flannel or other textile material treated with the composition of liquid silex or size mixed with coloring matter for the purpose of dyeing and stiffening the cloth at the same time and subjecting to the action of a die or dies, substantially as herein described, for the purpose of producing hats, bonnets, etc., with any desired surface which may be glazed with a varnish either before or after pressure, as set forth.

**46,569.—Invalid Bed.—Rodney H. Mathews, Painesville, Ohio :**

I claim, first, The sleeved apron, J, of water-proof fabric, constructed and used as described.

Second, The frame, A, jointed as described, and consisting of four sections or parts, a b c and d, the said sections being rigid transversely, but yielding at the joints longitudinally, as and for the purpose set forth.

Third, The foot blocks, H H', and shoulder blocks, I I', constructed as described, or any equivalent construction, in combination with the slotted plates, e e', and f f', or their equivalents, for adjusting and securing them therein, as and for the purpose set forth.

Fourth, The use and employment of the triangular handles, D and D', as herein explained, and for the purpose specified.

Fifth, I claim as a new and improved article of manufacture the described portable sick bed and accouching frame, constructed and arranged as stated, and for the purposes set forth.

**46,570.—Method of Curing Burns and Scalds.—Leonard Maxwell, Mitchel, Ind.:**

I claim the process of curing burns and scalds by the application of a coating of copal varnish to the burned or scalded parts of the body, substantially as and to the effect described.

**46,571.—Stop Valve.—John McClelland, Washington, D. C.:**

I claim, first, The hollow sliding stop valve, open at the bottom, the same being constructed and operating in the manner described for the purposes herein set forth.

Second, In combination therewith, the rings, a, constructed substantially as described.

Third, In combination with the invention claimed in the first clause, the rings, a, applied substantially as described.

**46,572.—Street Washer.—John McClelland, Washington, D. C.:**

I claim, first, Making the lower end of street washer cases pointed or cone shaped, in the manner herein described, for the purposes set forth.

Second, I claim the three-way cock, K, pipe, C, and key, D, arranged substantially as described.

Third, I claim the small channel, i, in the plug, k, connecting with the orifice, n, and the outlet, o, to discharge waste water, as herein set forth.

Fourth, I claim the lugs, p p and q q, and the projections, h h, on the cock, K, in combination with the nibs, r r, and the case, A, for holding the cock firmly in place.

Fifth, I claim embracing the cap, F, and the rod, D, of a street washer by a single attachment, substantially as described.

**46,573.—Spring Mattress.—G. W. Mitchell, Saint Louis, Mo.:**

I claim, first, The guide cones, d, in combination with the springs, A, caps, C, and flexible connections, c, applied substantially as and for the purpose described.

Second, The flexible connecting pieces, E, in connection with the caps, C, of the springs, applied and operating substantially as and for the purpose specified.

Third, The steady pins, b, and locking bars, D, in combination with the preceding.

Fourth, Stuffing the mattress on the sides as well as on the top, substantially as and in combination with the preceding.

**46,574.—Carpenter's Hammer.—John O. Montignani, Albany, N. Y.:**

I claim the method of constructing a hammer by finishing what is ordinarily a claw end with a steel cutting edge, like that of an adze or chisel, as described in the above specification.

I claim also the construction of the cleft for drawing nails, as shown at E, in combination with the above adze or chisel edge.

**46,575.—Interlined Under-garment for Ladies.—C. L. Morehouse, Cleveland, Ohio :**

I claim the garment, when provided with a detachable interlining of soft leather, as herein set forth, the same being a new article of manufacture.

**46,576.—Escapement for Timepiece.—Don J. Mozart, New York City:**

I claim, first, The hooked detent, h, applied to the scape wheel, A, for arresting the same, in conjunction with a tripping tooth, c, and pallet, e, arranged and operating substantially as described.

Second, The detent rest, i, when applied to a detent which is constructed and operated substantially as described.

Third, Forming the detent spring, s', and the tripping spring, s, in one piece, and applying the same to the detent staff, ], substantially as described.

**46,577.—Calendar Clock.—Don. J. Mozart, New York City:**

I claim, first, Causing the wheel, B, to release the mouth disk, C, once in every revolution of said wheel, by means of a pin, k', acting upon the escapement, E, of said disk substantially as described.

Second, The pivoted, crescent shaped escapement, E, in combination with the pins, p, on a notched disk, C, when these parts are arranged and operated substantially as described.

Third, The pinion, b, cam, b, and spring slide, s, in combination with the notched disk, C, and pall, H, substantially as described.

Fourth, The notched disk, C, constructed as set forth, in combination with levers, b b', having teeth, a a' a'', and lugs, c c', formed on them, and which are acted upon by a spring, b2, substantially as described.

Fifth, operating the day hand, D, by means of the tripping arm, h3, pawl, i, and notched wheel, j, when said arm is attached to and actuates the escapement of the wheel, B, substantially as described.

**46,578.—Powder for facing Molds.—James Nichols and Wm. Batty, Cincinnati, Ohio :**

We claim the molders' "facing" powder composed and prepared in the manner described.

**46,579.—Bird Cage.—Charles L. Osborn, Brooklyn, N. Y.:**

I claim, first, The combination of curved rest, B, rim, D, lip, E and hook, F, or their equivalents, operating together to secure a cage to its base.

Second, The arrangement described by which the feed cups are inserted and secured without danger of the escape of the bird when removed.

**46,580.—Hoisting Apparatus.—Charles R. Otis, Yonkers, N. Y.:**

First, I claim the combination of a governor and brake with each other and with the drum of a hoisting machine to operate substantially as herein specified under the circumstances herein set forth.

Second, Combining the governor with the loaded lever of the brake by means of a lever, r, or its equivalent deriving motion from the governor and acting as a support under a portion of the said loaded lever while the rotation of the governor does not exceed a certain velocity but escaping from under the said loaded lever when such velocity is exceeded, substantially as and for the purpose herein described.

Third, Applying a safety device at or near the highest point of a hoisting apparatus to operate substantially as and for the purpose set forth herein.

**46,581.—Soda Water Cooler and draught Pedestal,—George W. Palmer, Brooklyn, N. Y. Antedated Feb. 20, 1865 :**

I claim, first, The opening and door on the side of the refrigerator draught pedestal.

Second, The cooler made substantially as set forth and for the purpose described.

Third, The coating or lining of soda water coolers as herein described.

**46,582.—Steam Engine.—Daniel H. Paullins, Loudonville, Ohio :**

I claim the movable cylinder, E, provided with apertures, e e', to permit the steam to enter and escape from said cylinder alternately at the respective ends thereof when the said cylinder is moved by the action of its own piston head substantially as and for the purpose explained.

Second, In combination with the above I claim the arrangement of the chest, G, inlet pipes, G' G'', and grooved valve seats, F F', when employed in connection with the movable cylinder, E.

Third, In combination with the cylinder, E, actuated by its own cylinder head as specified I further claim the stationary external cylinder, H, and escape pipe, H', employed in combination with the movable cylinder, E, for the purpose of receiving and carrying off the steam after acting upon the piston as stated.

**46,583.—Horse Rake.—John Pennypacker, Charlestown, Penn.:**

I claim, first, The cams, h, constructed and arranged in respect to the levers, G, and ratchets, I, substantially as and for the purpose specified.

Second, The notched plate lever, Q, and plate, s, in combination with the levers, G, substantially as and for the purpose set forth.

**46,584.—Bee-hives.—Hiram Pensyer, Centralia, Ill.:**

I claim, first, the dark chambers, m m, above the side entrances, e e, to the litter box below in combination with said litter box, A, constructed with a sliding bottom, f, all constructed and arranged as and for the purposes described.

Second, The main hive, B, with its entrance, q, and dark chamber, r, in connection with the litter box, A, provided with entrances, e e, on each side of entrance, q, and sliding bottom, f, when constructed and arranged as and for the purposes described.

**46,585.—Manufacture of Glucose.—George R. Percy, New York City :**

I claim the obtaining of glucose or grape sugar from the whey of milk or from milk sugar.

**46,586.—Tip for Oil Cup.—Frank P. Pfleghar and Wm. Shollhorn, New Haven, Conn.:**

We claim a new article of manufacture the herein described cast metal tip for oil cups.

**46,587.—Bag Mouth Fastener.—Timothy K. Reed, North Bridgewater, Mass.:**

I claim a fastening device for bags having a construction substantially as specified.

**46,588.—Spinning Machine.—John Rich, Conway, Mass.:**

I claim, first, The combination in a tool spinning frame or machine of the twisting spindle, B, ring and traveler, E, and a draw twisting whirl, F, with its holding fingers, c d, substantially as and for the purposes herein described.

Second, The combination with the draw twisting whirl and its holding fingers, c d, of the holding clamp, T, and feed roll, Q, substantially as and for the purposes described.

Third, The combination with the feed roll of the feed pulley, B, and spring feed arm, Z, substantially as and for the purposes described.

Fourth, The combination of the dogs, y, and x, with the incline on the long upright piece, Y, and sliding pin, H, for the purpose of operating the feed arm, Z, substantially in the manner herein described.

Fifth, The use and employment in wool spinning machines of a friction pad acting intermittently on the pulley of the feed roller, for delivering the roving, as and for the purposes set forth.

Sixth, The combination with the clamp, T, of the mechanism described for operating it at the proper time substantially as set forth.

Seventh, The hinged dog, x, in combination with the incline on the short upright piece, N, as and for the purpose set forth.

Eighth, The adjustable face, 7, in combination with the upright piece, v, and hinged dog, x, or the equivalent thereof for the purpose stated.

Ninth, The draw twisting whirl, F, in combination with the holding or retaining fingers, c d, constructed and operating as and for the purposes herein described.

Tenth, The combination of mechanism constructed and arranged substantially as above described for drawing and twisting woolen threads simultaneously as herein set forth.

**46,589.—Row Lock.—Wm. Sage, Berlin, Conn.:**

I claim the plate, C, having a hub, D, twined up either with or without a screw, or corrugated surface formed thereon in combination with the chamber in the base of a row lock substantially as described.

Second, I claim the employment of the twin bolt, E', or its equivalent in combination with the row lock plate, C, substantially as described.

**46,590.—Trace Lock.—J. B. Shaw, New Haven, Conn.:**

I claim the herein described trace lock constructed substantially as specified.

**46,591.—Wood Bending Machine.—Fridolin Smith and Peter Swope, Tiffin, Ohio:**

First, I claim securing the patterns, F, in position to receive the strips, g, of wood as they are bent by means of expansible blocks, G G, substantially as described.

Second, applying the pattern holders, G G, to the frame of the machine that they can be elevated or depressed and held down firmly in place to receive the strip of wood as it is bent substantially as described.

Third, the bending heads, c c, in combination with the strip, d, and detachable strip, d', when used in conjunction with a pattern, F, and expansible holders, F G, substantially as described.

Fourth, The arrangement of the hooks, e e, strip, d', and adjustable cams, f f', in combination with the bending devices described and the removable pattern, substantially in the manner and for the purpose described.

**46,592.—Spring Balances.—Wm. B. Snyder, Lakeville, Conn.:**

I claim the arrangement of the two sliding indices to weighing balances in the manner and for the purpose substantially as herein set forth and described.

**46,593.—Cooling and Ventilating Ships and other Vessels.—Daniel E. Somes, Washington, D. C.:**

First, I claim cooling and ventilating vessels in the manner herein described.

Second, I claim cooling air for the purpose of cooling and ventilating vessels by forcing the air through submerged pipes or their equivalents substantially as set forth and described.

Third, I claim the forcing of air into ships and other vessels by the motion of such vessel in the water or by the action of the waves against or around the vessel.

Fourth, I claim affixing to the side of the ship or vessel a device or devices substantially as described so that the motion of the vessel in the water or of the water against the vessel shall produce a blast of air as described.

Fifth, I claim the devices herein described or their equivalents for airing, cooling and ventilating vessels for carrying grain or other perishable freight.

Sixth, I claim constructing the interior of a vessel for carrying grain or other perishable freight substantially as described so that air may be conveyed through said vessel by means of perforated walls or tubes as set forth, and this whether the air has been previously cooled or not.

46,594.—Cooling and Condensing Apparatus used in Brewing and Distilling.—Daniel E. Somes, Washington, D. C.:—

First, I claim the manufacture and use of coolers and condensers for use in brewing and distilling constructed and operating substantially as herein set forth and described.

Second, A cooling apparatus for cooling worts beer and other similar liquids composed of one or more subterranean tanks, reservoir pipes or their equivalents for cooling water in combination with suitable apparatus for using the water thus cooled for the purpose of cooling worts, beer or similar liquids.

Third, The combination of a subterranean cooling apparatus for cooling water with suitable apparatus for condensing and cooling distillates substantially as set forth and described.

Fourth, The combination of the subterranean cooling vessels the apparatus for cooling and condensing liquids or distillates with a pump propeller screw or other suitable means for causing a circulation of the water in apparatus constructed according to the principle of Fig. 2, as herein set forth and explained.

46,595.—Cooling Preserving Houses, Packing Houses, Refrigerators and other similar Structures.—Daniel E. Somes, Washington, D. C.:

I claim the process herein described for the purpose of cooling preserving houses, packing houses, refrigerators, store rooms, and similar structures, said processes consisting in using the low temperature of the earth at certain depths below its surface for the purpose of cooling either water or air or both by means of a combination of devices and apparatus substantially such as herein described or their equivalents.

Second, I claim the process herein described or any equivalent means for cooling water in combination with the process for cooling air by first compressing it in contact with a cold surface and then permitting it to expand when used for the purpose of cooling and preserving as herein set forth and described.

Third, I claim cooling refrigerators and salting tanks in packing houses and other similar structures by means a current of cold water or cold brine as set forth and described.

46,596.—Mode of Cooling and Ventilating Dwellings, Churches, Hospitals, Theaters and other Buildings.—Daniel E. Somes, Washington, D. C.:

I claim, first, Cooling and ventilating dwellings, churches, hospitals, theaters and other buildings substantially as herein set forth and described.

Second, The combination of a system of subterranean pipes, tanks or reservoirs, with a corresponding system of pipes, channels, reservoirs or their equivalents, in or near the building to be cooled, so as to cool and ventilate substantially as described.

Third, Cooling air by conducing it through or around water pipes, or compressing it in pipes, tanks or reservoirs, in contact with any cooling medium, and then permitting it to expand so as to cool and ventillate buildings substantially as described.

Fourth, Cooling and equalizing the temperature of buildings by means of refrigerating chamber or chambers, with water pipes or their equivalents for conveying a current of water, in combination with suitable devices and apparatus for cooling the water, all substantially as set forth.

Fifth, Cooling buildings by means of pipes or other channels for water placed in the wall, between the two walls, or in the buildings to be cooled, and connected with a subterranean refrigerating apparatus as set forth and described.

Sixth, Combining with the devices herein described for equalizing the temperature of the earth below its surface, devices for heating or warming such water, so as in cold weather to warm buildings constructed substantially as herein set forth and described.

Seventh, The construction of iron buildings with tubes, channels or spaces in the walls, in combination with cooling and warming apparatus constructed substantially as herein set forth and described.

46,597.—Percussion Grinder.—Ansom P. Stevens, Brooklyn, N. Y.:

I claim the combination of the two grinders one of which turns upon the other and is raised and permitted to fall at intervals so as to pound and grind the material alternately, substantially as set forth.

I also claim the combination of the said two grinders with apertures in the lower grinder for the escape of fine material, substantially as set forth.

46,598.—Smoking Pipe.—John D. Stewart, Baltimore, Md.:

I claim giving such a shape to the stem, B, of a tobacco-pipe as to form a trap, d, in the smoke passage thereof for the purpose herein described.

I also claim the openings to the aforesaid trap, d, in connection with the removable devices for closing the same substantially as described and for the purpose herein set forth.

46,599.—Lifting Jack.—Wm. M. K. Thornton, Clinton Junction, Wis.:

I claim the combination of the friction wheels, a a, with the jack staff, B, which is operated by means of a rack and segment substantially as described.

Second, The application of friction wheels to the back edge of a jack staff which has a rack formed on its opposite edge adapted to receive the toothed segment formed on the end of the removable lever, C, substantially as described.

Third, The relative arrangement of the bearings, f f, and friction wheels, a a, on the standards of the jack staff which is operated substantially as described.

46,600.—Lamp Shade.—M. J. Wellman and J. J. Greenough, New York City:

I claim the shade holder constructed in the manner and for the purpose herein set forth.

46,601.—Heating Furnace.—George W. Wilson, Chelsea, Mass.:

I claim the combination and arrangement of the fire-place, B, ash chamber, C, radiator, E, descending pipes, i i, horizontal flues, h h, ascending pipes, g g, damper, I, and escape flue, e, the whole being arranged with respect to the air heating chamber, A, substantially as set forth.

I also claim the combination of the air receiving chamber, I, and its vibratory valves, l l, with the air treating chamber, A, and the fire place provided with flues substantially as described for the escape of the volatile products of combustion.

I also claim the arrangement of the air ducts, G H H, with the air receiving chamber, I, the air heating chamber, A, the fire place, B, and ash chamber thereof.

46,602.—Plugging Instrument for the Teeth.—Barnabas Wood, Albany, N. Y.:

I claim the herein-described instrument, consisting of a metallic head, as described, affixed to a tubular shaft, whether of metal or other material, for an instrument for filling teeth, with the herein-mentioned fusible metal filling or other similar material.

I claim, first, The construction of the head, A, with a bulb, plate and neck, as represented.

Second, The formation of the bulb, b, between the blade, a, and the neck, c.

Third, The combination of the head, A, and tubular shaft, B or E.

Fourth, Also the application of the insulating tubular casing, D, to the tubular shaft, B.

46,603.—Pipe Coupling.—Warren N. Abbott (assignor to himself and Dwight B. Rich), Boston, Mass.:

I claim the within-described detachable coupling, in which the end of pipe is confined between the two portions, B and C, in the manner substantially as described.

46,604.—Machine for Cutting Pasteboard for Boxes.—Elizur E. Clarke (assignor to Franklin N. Clarke), New Haven, Conn.:

I claim, first, The zig-zag cutter, constructed and arranged in relation to the cutter holder, cutter stock, cutter bar and main cylinder, so as to operate in the manner and for the purpose described, and whether the same is used in connection with scoring or ordinary cutters, substantially as set forth.

Second, The combination and arrangement for the adjustment and suspension of the upper feed roll, B, substantially as set forth and described, and for the purpose specified.

46,605.—Gas-burning Stoves.—Henry Howson (assignor to Stuart & Peterson), Philadelphia, Pa.:

I claim, first, An annular-perforated plate, E, arranged on or forming a part of a round or cylinder stove, at or near the upper end of the fireplace, in combination with an annular-perforated plate or register, F, when the latter, as well as the register, are so formed and adapted to each other that any difference in the expansion or contraction of the register and plate cannot impair the former or disturb its tendency to fit by its own weight on the plate, E.

Second, An inclined plate, E, formed by the annular indentation of the stove immediately above the fireplace, in combination with the annular-perforated plate or register, as seen in Figs. 4 and 6.

Third, Two circular and indented or beveled surfaces, formed by contracting the body of the stove, in combination with two annular-perforated plates, the one above and the other below the point contracted as seen in Fig. 5.

Fourth, In combination with the ash-box, I claim the beveled damper, I, with its perforations or notches, when the said damper is adapted to the beveled opening of the ash-pit, and its notches or perforations, substantially as set forth, for the purpose specified.

46,606.—Horse Collar and Hames.—Martin Killacky (assignor to himself and J. G. Rouse), Philadelphia, Pa.:

I claim the hames, A A', combined with and forming part of the collar, B B', when the said hames are hinged together at the top and connected together at the bottom, by the device herein described, or the equivalent to the same, for the purpose specified.

46,607.—Mode of Making Wick.—Antonio Meucci, Richmond, N. Y., assignor to Wm. E. Ridder, New York City:

I claim the new manufacture of wick and wicking of decomposed vegetable fiber, substantially as herein set forth.

46,608.—Proportion of India-rubber for the Manufacture of Hose, Belting, Packing, Etc.—Edwin L. Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim preparing India-rubber for mechanical purposes in the manner substantially as herein set forth.

46,609.—Manufacture of Hard Rubber.—Edwin L. Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim the compound produced by combining the within-described vulcanizing compound with india-rubber, and the said compound cured in the manner and for the purpose herein set forth.

46,610.—Process of Manufacturing India-rubber, Gutta-percha, Etc.—Edwin Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim, first, The within-described compound of vegetable oil and sulphur, prepared substantially as and for the purposes specified.

Second, The manufacture or preparation produced by combining the within-described compound with india-rubber, gutta-percha, or other similar gum or gums, substantially as and for the purposes specified.

46,611.—Water-proof Fabric.—Edwin L. Simpson, Bridgeport, Conn., assignor to Simon Stevens, New York City:

I claim as a new article of manufacture, coating water-proof fabrics with stocks, when the fabric is first prepared in the manner herein set forth.

46,612.—Revolving Fire-arm.—Charles Edward Sneider assignor to himself and Thomas Poultney), Baltimore, Md.:

I claim, first, The pins, D, passing through the rear part of the cylinder, and provided at their forward ends with heads, d', adapted to act as gas checks, in the event of gas escaping from the rear of the cartridge.

Second, In combination with the aforesaid pins, D, I claim the described construction and relative arrangement of the rear end of the cylinder and the hammer, whereby the pins, D, after having been employed for the explosion of the cartridges, are made capable of an additional forward movement, to effect the ejection of the exploded shells, as explained.

46,613.—Telegraph Cable.—Daniel H. Southworth, New York City, assignor to himself, Blase Lorillard and Chas. Ferris, White Plains, N. Y.:

I claim inclosing and separately insulating several telegraph wires or conductors in a cable, by means of an insulating piece, having pins or flanges, and otherwise constructed substantially as herein specified.

46,614.—Bench Plane.—Wing H. Taber (assignor to himself and Thos. H. Abbott), Lowell, Mass.:

I claim the combination of the adjustable bed or bearing, G, the screws, F and D, and the lever, E, the whole being arranged with respect to the plane iron, and the stock, substantially as specified.

I also claim the arrangement of the adjustable bed, G, with the fulcrum screw, D, the lever, E, the screw, F, the plane iron, B, and its bearing, b, arranged at the lower part of the throat, a, as described.

46,615.—Seed Planter.—George W. Brown, Galesburg, Ill.:

First, I claim, in combination with a seed-planting machine, having its seeding devices forward of the center of the wheels, a movable seat, F, with wheels, f and f2, and guides, a and a', for the purpose described.

Second, I claim, in combination with the operative parts of a seed-planting machine the metal sockets, A, constructed as shown, and arranged for use in combination with the side frames, A' A2, for the purpose of widening and narrowing the machine, in the manner and for the purpose specided herein.

Third, I claim the employment of a corresponding metal socket, H, and adjustable side parts, H' H2, in combination with the frame, A A' A2, or its equivalent, so that the seed bar shall be shortened and lengthened to correspond with the changes in width of the frame, substantially as herein specified.

Fourth, I claim, in a continuously-progressing seed-planting machine, wherein the seed-dropping mechanism is operated by an attendant, in contradistinction to automatic dropping, the operating of horizontal seed wheels by hand, so as to make complete revolutions by increments, substantially in the manner and for the purposes herein set forth.

Fifth, I claim in a seed-planting machine, the employment of seed-dropping wheel and operating fork, combined and arranged as herein represented and described, so that the movement of the fork in one direction will act on the wheel to turn it to a certain extent in a certain direction, and the movement of the fork in the opposite direction will act on the wheel to turn it to a certain extent in the same direction as before, thus turning the wheel by increments around in one uniform direction, by reciprocating movements of the fork, as herein set forth.

Sixth, I claim in such machine holding the drill mechanism at rest, by carrying the inclines, u, beyond the range of the pins, T, substantially in the manner and for the purpose herein set forth.

Seventh, I claim, in combination with a seed planting machine, carried on wheels, the employment of two independently-operated scrapers, X X2, which are severally forced against and released from the supporting wheels, at the will of the operator, by means of treadles, Y' Y2, connected and arranged to operate substantially as and for the purpose herein set forth.

## RE-ISSUES.

1,882.—Manufacture of Wrought Cannon.—Horatio Ames, Falls Village, Conn. Patented Aug. 16, 1864:

I claim in a wrought-iron gun composed of a series of concentric rings welded together, and to the plates forming the breech of the gun, the turning or planing of the contact surfaces thereof before welding, so as to have them scaled and clean, to insure perfect welding, substantially as described.

I also claim in a wrought iron gun composed of a series of concentric rings welded together, the so shaping of one of the end surfaces that is to be welded to the next adjacent end surface as that they shall first unite at or near the base, and thence be welded toward the primeter, substantially as and for the purpose described.

I also claim as an auxiliary in the making of a wrought-iron gun composed of a series of concentric rings welded together, a portable and removable centering pin, for the purpose of matching the sections as they are put together, and for keeping the bore of the gun as nearly central and straight as possible, substantially as described.

I also claim a wrought-iron gun composed mainly of a series of concentric rings that are fitted, and lap and butt, welded together, substantially as described.

1,883.—Method of making Mirrors or Looking Glasses. Louis Paul Angenard, New York City. Patented Jan. 31, 1865:

I claim the use and application of a solution of platina as a substitute for quicksilver for coating the surface of glass for making mirrors and looking glasses, substantially as hereinafter described.

1,884.—Truss Bridge.—Reuben Comins, Troy, N. Y. Patented Feb. 10, 1857:

I claim the employment of a shoe for bridges and truss frames, which is of the inverted, I, angular or curved shape where the ends of the diagonal braces rest, in combination with the projections, plates, or spurs extending through the stringers to the washers and nuts upon the opposite side of such stringers, in the manner and for the purposes substantially as herein described and set forth.

1,885.—Composition of Matter.—Lewis Francis and Cyrus H. Loutrel (assignees of Lewis Francis), New York City. Patented March 8, 1864. Re-issued Sept. 27, 1864:

We claim combining an alkali or alkalies or alkaline earths, or any of their compounds, with glue or glycerine, to form a new and useful composition of matter for various purposes.

1,886.—Composition of Matter.—Lewis Francis and Cyrus H. Loutrel (assignees of Lewis Francis), New York City. Patented March 8, 1864. Re-issued Sept. 27, 1864:

We claim combining glue, glycerine, and sugar or any other saccharine matter, to form a new and useful composition of matter for various purposes.

1,887.—Composition of Matter.—Lewis Francis and Cyrus H. Loutrel (assignees of Lewis Francis), New York City. Patented May 6, 1862.

We claim combining glue, glycerine, and castor oil, or any of the fixed oils, to form a new and useful composition of matter for various purposes.

1,888.—Harvester.—Reuben Hoffheins, Dover, Pa. Patented Nov. 3, 1863:

I claim, first, The main frame and gear frame, A A, constructed substantially as represented in figure 4, and herein described.

Second, The main frame and gear frame, A A, constructed open at each end, in combination with shafts, gearing and double drive wheels, arranged and operating substantially as and for the purposes specified.

Third, The flange, a, cast or formed upon the gear frame for the combined purposes of strengthening the latter and protecting the crank shaft, E, substantially as described

Fourth, The movable tongue, K, adapted to be attached to the frame on either side of the wheel, B', and employed to support or raise the inner end of the cutting apparatus, substantially as described.

Fifth, Providing for the attachment of the tongue or draft pole of a harvesting machine upon a draft frame, on both the inner and outer side of the drive wheel, B', in combination with the provision made for changing the point of support of the cutting apparatus from the inner to the outer side of the drive wheel, B', and vice versa, substantially as and for the purpose set forth.

Sixth, Attaching the cutting apparatus by means of the compound swivel joint, substantially as described, to the drag bar, I, arranged as described for the purpose set forth.

Seventh, The combination of the transverse swivel joint and bracing guides, h', substantially as and for the purpose set forth.

Eighth, The inner shoe constructed with the rear extension, b4, forming a means of attachment between the cutting apparatus and the platform, and with a means of attachment between it and a pendulous drag bar, so as to form a joint connection therewith, all substantially in the manner and for the purposes herein described.

Tenth, The rigid arm projecting inward from the finger beam to a position beyond the wheel, B', in combination with a suspending device and an extension of the tongue or draft pole, substantially as and for the purposes set forth.

1,889.—Steam-engine Governor.—Junius Judson, Rochester, N. Y. Patented March 4, 1851:

I claim communicating the action of a governor to its valve or valves, gate, or equivalent regulating device, in such a manner that when the speed of the engine or motor becomes low, either from increase of resistance to overcome, or from diminution of pressure of the motive power, the said valve or equivalent will be accelerated or caused to move through a comparatively large space, to uncover or cover a comparatively large area of the valve or gate opening, so as to add to or take from the engine or motor, by a given change of its speed, comparatively large amounts of power; and also when the speed becomes high, either from diminution of resistance to overcome or from increase of pressure of the motive power, the said valve or equivalent will be, by a like change of speed, retarded or caused to move through a comparatively small space, to uncover or cover a comparatively small area of valve opening, so as to add to or take from the engine or motor comparatively small amounts of power for the purpose of securing, as nearly as may be, uniform speed of the engine or motor under all variations of the power or resistance, substantially as herein set forth.

1,890.—Base-burning Stove.—Dennis G. Littlefield, Albany, N. Y. Patented Jan. 24, 1854. Re-issued Nov. 8, 1864:

I claim the combination of a reserve fuel supplying cylinder, a separate ash pit, a chamber to receive the products of combustion, and an exhausting exit flue, substantially as and for the purposes described.

1,891.—Railroad Rails.—Wm. D. O'Brien, Brooklyn, N. Y. Patented July 19, 1864:

I claim an iron bar formed thicker in the middle than at the sides or edges, and curved in substantially the form specified for the purposes set forth.

I also claim the joint plate, e, curved on its under side to set upon the sill and with its upper surface corresponding to the under side of the railroad bars, for the purposes and as specified.

1,892.—Straw Cutter.—D'Arcy Porter and K. Smith (assignees of D'Arcy Porter), Cleveland, Ohio. Patented July 5, 1864:

We claim, first, The spring, D E, or its equivalent, knite, F', and vibrating box or board, when arranged and operating substantially as and for the purpose set forth.

Second, We claim the gage plate, J, and box, B, in combination with the knife, F', and spring, D E, as and for the purpose herein before described.

1,893.—Horse Hay Rake.—Randal Pratt, Marple Township, Pa. Patented Jan. 8, 1856:

I claim, first, A wheeled rake, with a standboard or platform, C, two sets of treadle levers, two footboards, and a lifting and a pressure bar, arranged and operating substantially in the manner and for the purpose described.

Second, A wheeled rake, with a hand rail, a standboard, treadle levers, footboards, and a lifting and a pressure bar, arranged and operating substantially in the manner and for the purpose described.

Third, The arrangement of the pressure bar, k, upon levers, k' k', which are independent in their rising movements of the treadle levers, k2 k2, but are dependent upon said levers or their equivalent in their depressing movement, substantially as and for the purposes herein set forth.

Fourth, The arrangement in a wheeled rake of independently articulating teeth, a lifting bar, a pressure bar and treadles, substantially in the manner and for the purposes herein described.

Fifth, The arrangement with rake teeth, which terminate on their axial rod as described, of a pressure bar and a lifting bar, such bars having separate movements imparted to them, and both acting on the teeth at points in rear of the axial bar, b, substantially as herein described.

Sixth, The concentric arrangement of the lifting and pressure bars, or either of them, in combination with the extending of the frames or levers of said bars in front of the axial bar, b, and with the arrangement of the bars, G and K, in rear of the axial bar, b, substantially in the manner and for the purpose described.

Seventh, A treadle frame with lifting bar, G, pivoted concentric with the axis of motion of the rake teeth, in the manner and for the purpose set forth.

1,894.—Horse Hay Rake.—Randal Pratt, Marple Township, Pa. Patented Jan. 8, 1856:

I claim, first, Constructing a wheeled horse rake with a vibrating clearer to its teeth, so that the attendant or driver while riding on the rake carriage can operate the clearer and the rake teeth, substantially in the manner and for the purpose described.

Second, The arrangement and connection of a vibrating clearer with a vibrating rake, so that converse vibrating movements can be imparted to the rake teeth and to the clearer, at the same time and by the one actuating contrivance, while the machine is in operation and the attendant, who vibrates the rake and clearer, is mounted upon the machine, substantially as herein described.

1,895.—Horse Hay Rake.—Randal Pratt, Marple Township, Pa. Patented Jan. 8, 1856:

I claim the staple guides, p, to rake teeth, substantially as and for the purposes set forth.

1,896.—Casting Bottoms on Sheet Metal Ware.—Leonard J. Worden, Utica, N. Y., assignor to himself and Hicks, Wolfe & Co., New York City. Patented June 2, 1863:

I claim the employment of cast-iron bottoms in the manufacture of teakettles, wash boilers, coal hods, pans and other articles for kitchen use, united to and combined with the cylinder or body thereof in the manner and by the means substantially as herein described and set forth.

1,897.—Machine for making Drain Pipe.—Bradford S. Pierce, New Bedford, Mass., and Mason R. Pierce, New York City. Patented April 19, 1859:

We claim, first, A mold consisting of a case capable of being properly secured around the material while the pipe is being molded and of being freed from the pipe when the molding is completed, in combination with a core, and also with a core socket having a provision for freeing the socket or pipe or both from the core, the whole operating substantially as set forth.

Second, The arrangement of the mixing apparatus and of the core-relieving devices above the platform which conveys the molds, in the manner and for the purpose substantially as specified.

Third, The combination of the core socket with the revolving disk which receives the core and the mold, when the disk contains a provision for enabling the socket or pipe or both to be freed from the core, substantially as described.

## DESIGNS.

2,034.—Plates of a Cookstove.—Lewis Rathbone, Albany, N. Y.

2,035.—Plates of a Cookstove.—Lewis Rathbone, Albany, N. Y.

2,036.—Plates of a Cookstove.—Wm. W. Stevens (assignor to Nathaniel P. Richardson & Co.), Portland, Me.

## EXTENSIONS.

Machines for Turning Irregular Form.—Philo S. Beers, Harnden, Conn.—Patented Feb. 18, 1851. Extended Feb. 11, 1865:

I claim, first, The three-cutter cylinders, A B C, with cutters arranged as within described, in combination with the sliding frame, compound cams and cam rails, constructed and arranged substantially in the manner and for the purpose herein described.

Second, I claim the combination of the compound cams and cam rails, with the sliding frame and devices, within described, for holding and revolving the timber material, whereby such vertical motion is produced in the latter, while being subjected to the action of revolving or vibrating cutters, as to reduce the timber to the required form.

Drawing Regulator for Spinning Machine.—Newell Wyllys, South Glastenbury, Conn. Patented Jan. 28, 1851. Re-issued July 12, 1864. Extended Jan. 20, 1865:

I claim the combination of the escapement mechanism, or its mechanical equivalent, with the trumpet, M, the counter weight, W, or its equivalent, and mechanism substantially as described, for revolving the screw, e, of the belt slipper, and of the mechanisms by which the sets of drawing rollers are revolved, the said escapement mechanism being connected with the trumpet and applied to the gear, s, and consisting of the disk, t, the pawls, a b, and the lever, y, and its operative mechanism, substantially as hereinbefore explained.

I claim, also, The arrangement of the trumpet arm, E, as herein described, in combination with the system of weighted levers, the escapement, the belt-shifting mechanism, the reversed cone pulleys and the mechanism operated by them, whereby the force required to move the trumpet is made to vary under different circumstances to a sufficient extent to prevent over sensitiveness in the mechanism, which changes the relative speed of the drawing rolls to inequalities in the slivers, while, at the same time, but little force is required to effect such changes, thus proportioning the draw more nearly than heretofore to the quantity of fiber in the sliver, and thereby rendering the latter of more uniform diameter and density.

Ventilating.—Henry Ruttan, Coburg, C. W. Patented Jan. 31, 1851. Extended Jan. 21, 1865:

I claim the arrangement and mode of operating the valves, A A, in reference to the air-heating space around the stove, by which the amount of air from within and without is graduated by a single movement.

I claim, also, The arrangement of the horizontal air-heating trunk, the vertical, D, leading thereto, and its valve, S, in combination with the air-heating space, G.

Sewing Machine.—W. O. Grover and Wm. E. Baker, Boston, Mass. Patented Feb. 11, 1851. Re-issued Dec. 3, 1861. Extended Feb. 10, 1865:

First, We claim in combination, first, an eye-pointed needle, which descends and carries its thread through the material supported on a table; second, a table which supports the material horizontally below the needle and above a thread carrier; third, a thread-carrier below the table, carrying a thread which is not passed through the material, operating together substantially as set forth.

Second, We claim in combination, first, a horizontal table or support; second, a feeding apparatus; third, a stitching apparatus; each having the distinguishing characteristics hereinbefore specified, and operating substantially as set forth, to make the double looped seam herein described.

Rotary Pump.—J. Stewart Gwynne, New York City. Patented Jan. 14, 1851. Extended Jan. 13, 1865:

I claim thus extending said pipe when the collar on the opposite side is made adjustable, and the parts so arranged that the joints of the piston case with said pipe and collar may be tightened as they wear by tightening the adjustable collar only as described. The piston and case and the suction pipe being constructed substantially as herein described.

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IMPORTANT TO HORSE RAKE MANUFACTURERS. —The subscribers, yielding to the solicitations of many manufacturers of Horse Rakes, have at length completed arrangements for furnishing Rake Teeth of any shape desired, bent and tempered to any pattern. We have no hesitation in assuring Rake Manufacturers that they can now rely upon procuring from us good reliable Teeth, of very superior temper, and in any quantity, on short notice. We furnish, in addition to the ordinary sizes of Round teeth, Sprout's Patent Shape Teeth, for which we have the exclusive right of manufacture. We annex List of Sizes:—7-16 inch Round, No. 1; 13-32 inch Round, No. 2; 3-8 inch Round, No. 3; Sprout's Patent, No. 1; Sprout's Patent, No. 2; Sprout's Patent, No. 3. Extra price for all Teeth over 5 feet in length, also when a coil or spring is made on the tooth. Nos. 1, 2 and 3, Sprout's Patent, correspond for strength with the same Nos. of Round, and are much lighter and more elastic. Our Teeth are all tested before leaving the shop, and warranted to be a perfect spring temper. Parties ordering Teeth should be careful to send pattern. We also furnish Rake Steel to order, cut to lengths, at lowest market rates. Terms cash. HUSSEY, WELLS & CO., Pittsburgh, Pa., Manufacturers of best Refined and all descriptions of Cast-steel. 1 13*

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REYNOLDS' TURBINE WATER WHEELS.—COMPETENT men are employed to measure streams, make plans, and put in flumes, wheels, and gearing. TALLCOT & UNDERHILL, No. 170 Broadway, New York. 1 XII.1y*

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Wrought-iron pipe, globe valves & cocks, pipe fittings, steam and gas-fitters' tools. John Ashcroft, 50 John st, New York. 1 11*

### Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, herausgegeben, und verabfolgen solche gratis an dieselben.

Erfinder, welche nicht mit der englischen Sprache bekannt sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich geschriebenen Beschreibungen beliebe man zu adressiren an

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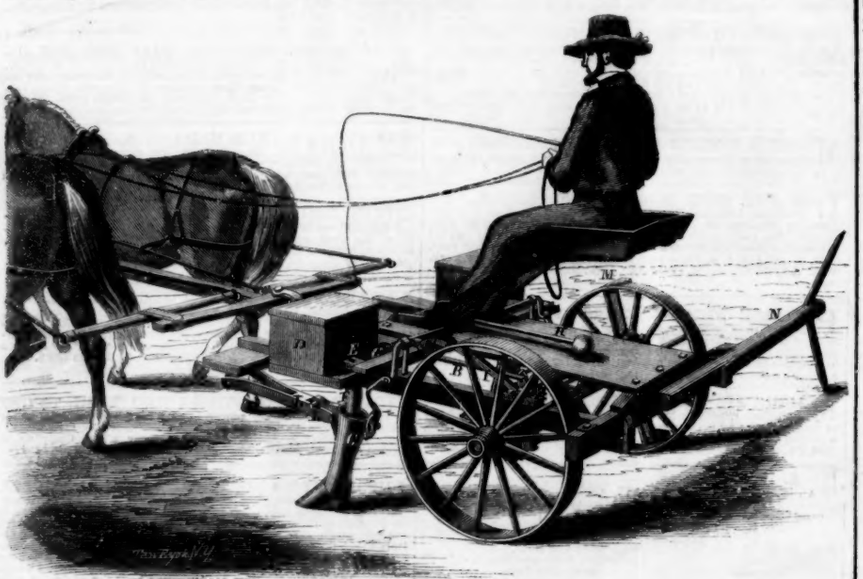
### Improved Corn Planter.

The old process of planting corn by hand was slow, tedious and painful, as the aching back of many a farmer could testify after the day's work was done. The machines invented for this purpose have not only expedited the process but cheapened the product, for where one acre could be planted by the old-fashioned plan, ten are now sown.

The machine illustrated herewith is the latest improvement in farming implements of its class, and it is designed to execute the work thoroughly and neatly, so that the growing crop will not only look nicely, but that every part of the field will be used to advantage; not close together in some parts and spread wide apart in others. This is also advantageous where horse cultivators are used, for where the rows are evenly planted little or no trouble and delay is experienced in driving between them.



AGNEW'S CORN PLANTER.

The improvements in this machine consist in providing the crank shaft, A, with a connecting rod, B, so that the slide, C, is driven back and forth through the seed hoppers, D. This slide has a recess, E, in it which withdraws the seed and deposits it in the tube, F, at each motion, so that it falls from thence into the furrow traced by the cultivator, G.

When it is desired to throw this seed-distributing device out of action it can be done by raising the lever, H. This lever commonly stands up by the driver, but is laid down here so that it can be seen. The act of lifting this lever causes the cam rod, I, to throw the gears, J, which drive the seeding device out of mesh, and it also lifts the cultivators, so that their operation is also suspended; this can be done at any time without stopping the team. When the driver backs for any purpose such as getting into position, turning around, etc., the cultivator tips up and does not work, but on starting again the pin, K, in the arm strikes against the bar, L, and holds the cultivator rigidly so that it tears up the ground again.

Another novel feature of this machine is the attachment of an arm, M, to the end of the axle opposite the reader. This arm has a foot on each end, and its use is to mark certain spots at equal distances apart during the progress of the machine. These marks occur exactly when the seed is dropped, and they serve as guides to the driver in planting a second row, so that when these marks coincide the seed is planted in regular rows across the field. The usual marker, N, is also provided.

This machine can be backed or turned very readily without deranging any part. It is under complete control, and all parts are in a small compass so that it can work close to a fence or hedge. It is made to plant the corn in squares, three feet apart, or in rows eighteen inches apart, two grains in a hill, or one grain a foot apart. Any of the alterations are made by simply putting a larger cog wheel on the driving shaft. By making a double box with another slide, it can be made to drop phosphates, guano, or whatever fertilizer is prepared, at the same time. This planter took the first premium at the State Fair held at Easton, Pa., last fall.

A patent was procured on this invention through the Scientific American Patent Agency on the 5th of April, 1864, by John Agnew, of Bath, Pa. Address him at that place.

### Ferry Boat With a "Woolfe" Engine.

A correspondent, Mr. W. W. Hanscom, writing from California, favors us with the following interesting communication:—"A ferry boat called the *Louise* is running between San Francisco and Oakland, which has two steam cylinders constructed on the Woolfe system. One of the cylinders is oscillating, 40 inches diameter of bore, 30 inches stroke, the other 18 inches diameter and same stroke, both being connected to the same crank, and setting at an angle of about 90 degrees to one another; the small cylinder has a single slide valve and takes steam nearly full stroke, from which cylinder it escapes into the larger having a pressure of 25 pounds above the atmosphere, and from which it is cut off at half stroke by a puppet valve worked by a cam on the shaft; the oscillating cylinder has a slide valve same as the small one.

The boiler pressure is 75 pounds above the atmosphere; from the larger cylinder it goes into a jet condenser and is then thrown overboard. A large tank is placed in the hold which carries the water for the boilers, none being taken from the condenser back to the boilers; fresh water is used. The boilers have steam in them from six o'clock in the morning until about half past seven in the evening; and during this time the boat runs between 60 and 70 miles, the crank making from 32 to 36 revolutions per minute, giving a speed of about 12 miles per hour and consuming three tuns of Mt. Diablo coal during the day. The distance between landings is between five and six miles and is made usually in about 28 minutes; the boat making ten to twelve trips per day.

### American Carpet Factories.

There are at the present time only about six large establishments employed in the manufacture of fine carpets in this country; while there is a considerable number of similar establishments engaged in a limited way in the manufacture of the cheaper styles of carpets. Four of the largest companies employ an aggregate capital of $6,500,000, while the aggregate annual capacity of three of them is four millions five hundred thousand yards of carpeting of various kinds. Of the four companies thus alluded to, one manufactures only Wilton and Brussels carpets and rugs, another only ingrain and three-ply, another ingrain, Venetian and Brussels, while the fourth manufactures velvet, Brussels, ingrain, three-ply and Venetian, besides a variety of rugs. One of these companies uses one million two hundred and fifty thousand pounds of wool annually five hundred thousand pounds of worsted yarn, and three hundred thousand pounds of flax or tow yarn. Another five tons of wool and two of jute and linen yarns. Another, with a capital of a million and a half of dollars, has two hundred and eighty-eight power-looms, and produces over two millions of yards of carpeting annually. In 1857, it was estimated that there were over five thousand power-looms in the various carpet factories of the United States, and there are probably many more at present. From one thousand three hundred to two thousand persons find employment in one of these large factories. The sales often reach to several million of dollars annually. During the first two years of the war the carpet manufacturers found their business better than usual, money being plenty and the people inclined to buy largely. But the unsettled state of financial affairs during the last two years has been felt in this business quite seriously. Although the present tariff almost prohibits the importation of foreign carpets, the duties on materials are at the same time so high as to vastly increase the expense of manufacturing.



FROM THE STEAM PRESS OF JOHN A. GRAY & GREEN.